3020
ROW-CROP STANDARD AND HI-CROP TRACTORS

OPERATORS MANUAL

3020 ROW-CROP STANDARD AND
HI-CROP TRACTORS

OMR34406 E4 English

JOHN DEERE TRACTOR WORKS
OMR34406 E4

LITHO IN THE U.S.A.
ENGLISH

TO THE PURCHASER

Your versatile new John Deere Tractor meets the exacting requirements of modern farming.

Operating ease and comfort, hydraulic power when and where you need it, the ability to match engine power and transmission speed to any job, outstanding economy and dependability, modern styling, and simplicity of lubrication and service are all special features of this great tractor.

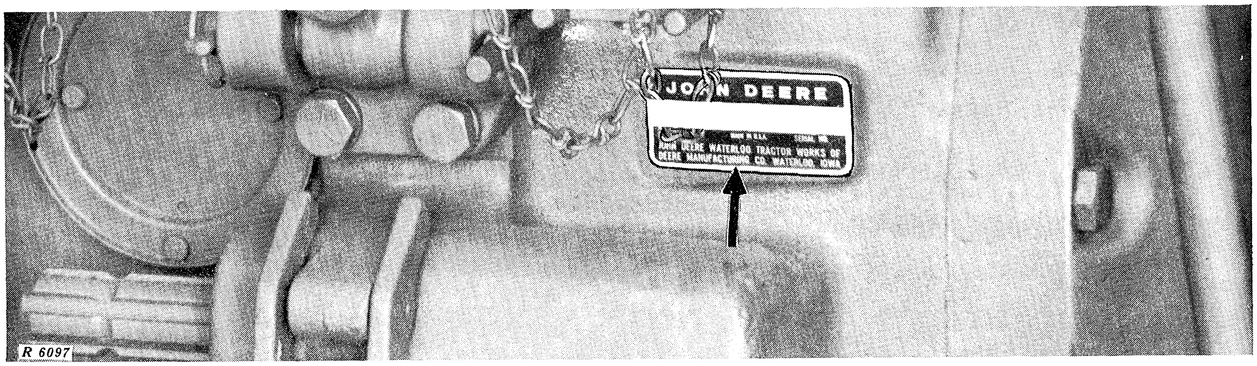
We are confident this modern tractor, combined with equally advanced John Deere tools and implements, will help you to farm better, easier, and more profitably.

At the time the tractor was delivered, the John Deere dealer discussed with you its safe operation and proper care. However, before putting the tractor to work, read this manual. It contains complete instructions for operating the tractor, caring for it, and taking full advantage of its many time- and labor-saving features. After reading the manual, keep it in a convenient place for quick and easy reference if questions arise concerning operation, lubrication, or service.

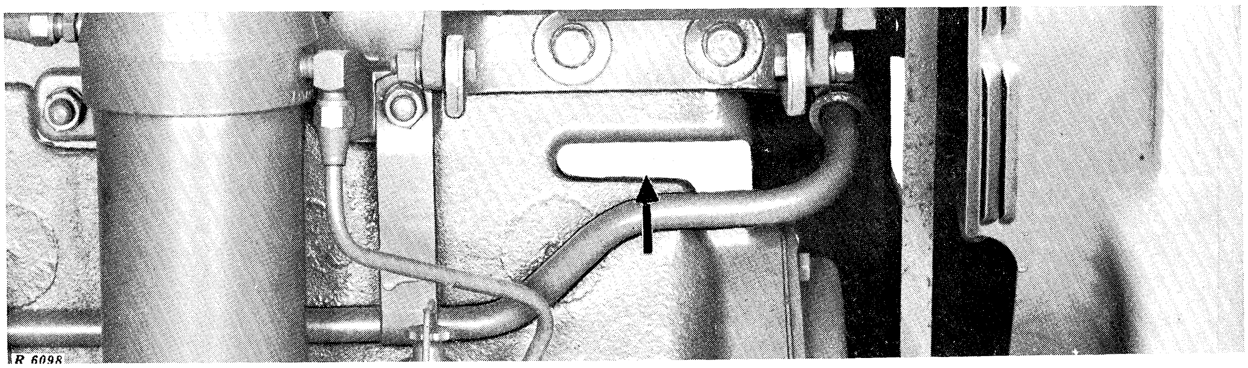
The service policy which you received with your new tractor certifies that the tractor was properly inspected and prepared for delivery by your John Deere dealer. Keep this policy in a safe place and present it to the dealer whenever services which it authorizes are required.

Your John Deere dealer wants to help you get the most value from your tractor. His skilled servicemen can handle every job efficiently. These men are trained in modern service methods; they have all necessary tools and equipment. If new parts are needed, only genuine John Deere parts will be installed. These parts are exact duplicates of the originals, made from the same patterns and of the same high-quality materials.

When in need of new parts, be prepared to furnish your dealer with the engine serial number, the tractor chassis serial number, and the tractor series number. For ready reference, locate and record the serial numbers in the spaces provided in the following illustrations.



Record Tractor Chassis Serial Number



Record Engine Serial Number

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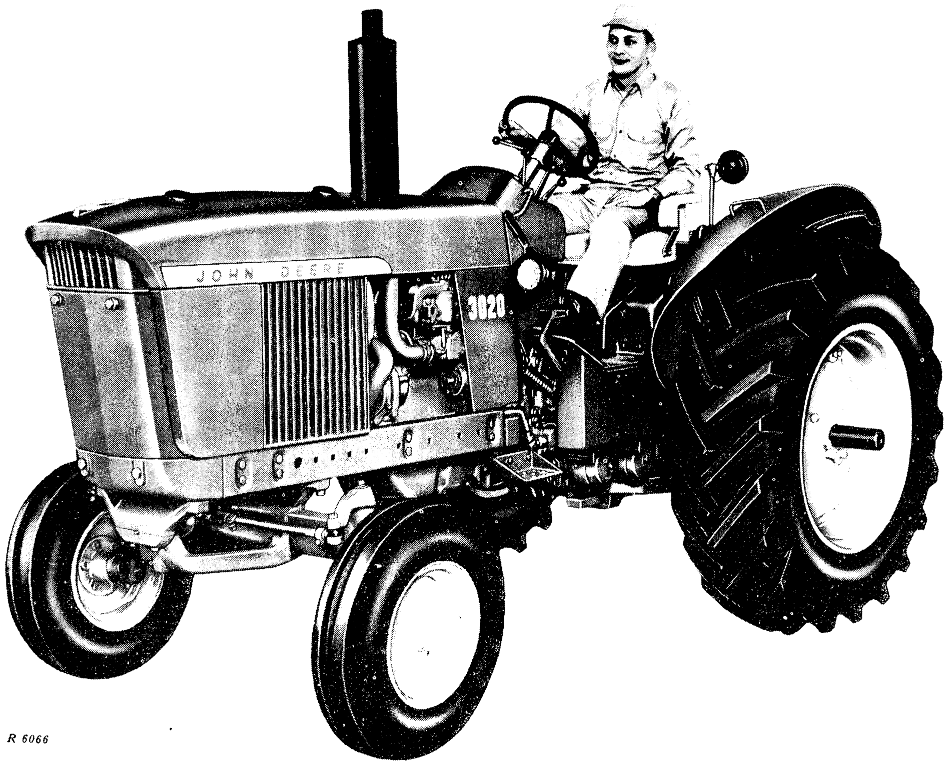
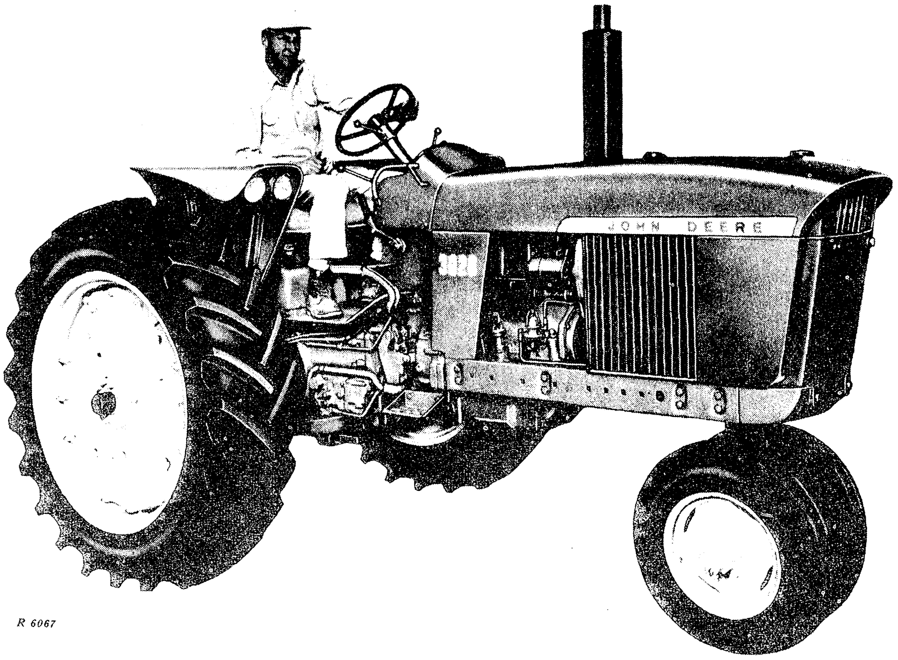


John Deere 3020 Standard Tractor with Gasoline Engine and Power Shift Transmission

SPECIFICATIONS

HORSEPOWER:*	Diesel	Gasoline	LP-Gas
PTO (observed)	65 h.p.	64 h.p.	64 h.p.
Drawbar (observed)	57 h.p.	55 h.p.	56 h.p.
ENGINE:			
Type	4-cylinder, in-line, valve-in-head		
Engine speeds:			
Idle for engine shutoff	....	420 rpm	500 rpm
Normal slow idle	600 rpm	650 rpm	650 rpm
Working range	1500 to 2500 rpm	1500 to 2500 rpm	1500 to 2500 rpm
Bore and stroke	4-1/4 in. x 4-3/4 in.	4-1/4 in. x 4 in.	4-1/4 in. x 4 in.
Displacement	270 cu. in.	227 cu. in.	227 cu. in.
Compression ratio	16.5 to 1	7.5 to 1	9.0 to 1
Firing order	1-3-4-2	1-3-4-2	1-3-4-2
Intake valve clearance	0.018 in.	0.015 in.	0.015 in.
Exhaust valve clearance	0.018 in.	0.028 in.	0.028 in.
Injection pump timing	TDC	....	....
Distributor timing (see page 64 for engine speed)	....	20° BTDC	25° BTDC
Distributor point gap	....	0.022 in.	0.022 in.
Spark plug gap	....	0.025 in.	0.015 in.
ELECTRICAL SYSTEM:			
Starter and generator voltage	24 volts	12 volts	12 volts
Lights and accessory voltage	12 volts	12 volts	12 volts
12-volt battery, 78-plate, 75 amp-hour	Two (connected in series)	One	One

**Above observed horsepower figures are official at 2500 engine rpm.*



John Deere 3020 Row-Crop Tractor with Gasoline Engine and Power Shift Transmission

COOLING SYSTEM:

Type	Pressurized with centrifugal pump
Engine temperature control	Heavy-duty thermostat

LUBRICATION SYSTEM . . . . Force-feed pressurized type with full-flow oil filter

CAPACITIES:

Fuel tank	Diesel and gasoline	29 U.S. gals.
	LP-Gas (80% full)	33.6 U.S. gals.
Crankcase	Dry system	9 U.S qts.
	At service intervals	8 U.S. qts.
Transmission-hydraulic system:		
Syncro-Range	Dry system	11 U.S. gals.
	At service intervals	8 U.S. gals.
Power Shift	Dry system	14 U.S. gals.
	At service intervals	11 U.S. gals.
Air cleaner	Diesel	4 U.S. pints
	Gasoline and LP-Gas	2-1/4 U.S. pints
Cooling system		19 U.S. qts.
Hi-crop final drive housings		1-3/4 U.S. qts.
Belt pulley		2-1/2 U.S. pints

SYNCRO-RANGE TRANSMISSION:

Type	Syncro-Range, constant mesh
Gear selections	8 forward and 2 reverse
Shifting	4 stations, synchronized shifting within stations

POWER SHIFT TRANSMISSION:

Type	Planetary gears, hydraulically actuated wet disk clutches and brakes
Gear selections	8 forward and 4 reverse
Shifting	Hydraulic, powershifting controlled by speed selector

POWER TAKE-OFF:

Type	Independent PTO with front and rear power take-off. Stub shafts used for rear PTO speed conversion on dual speed PTO.
Speed (2100 engine rpm)	Front—1000 rpm Dual speed rear—540 or 1000 rpm Single speed rear—1000 rpm

Specifications and design subject to change without notice.

HYDRAULIC SYSTEM:

Type	Closed center, constant pressure. Includes power steering, power brakes, and implement control
Maximum pressure	2250 psi

BRAKES . . . . Hydraulically power actuated, disk-type, operating in oil

GROUND SPEEDS . . . . See page 12

FRONT TIRES**

Row-crop	6.00 - 16, 6-ply
Standard	6.50 - 16, 6-ply

REAR TIRES**

Row-crop	13.6 - 38, 6-ply
Standard	18.4 - 30, 6-ply

FRONT WHEEL TREAD . . . . See pages 16 and 17

REAR WHEEL TREAD:

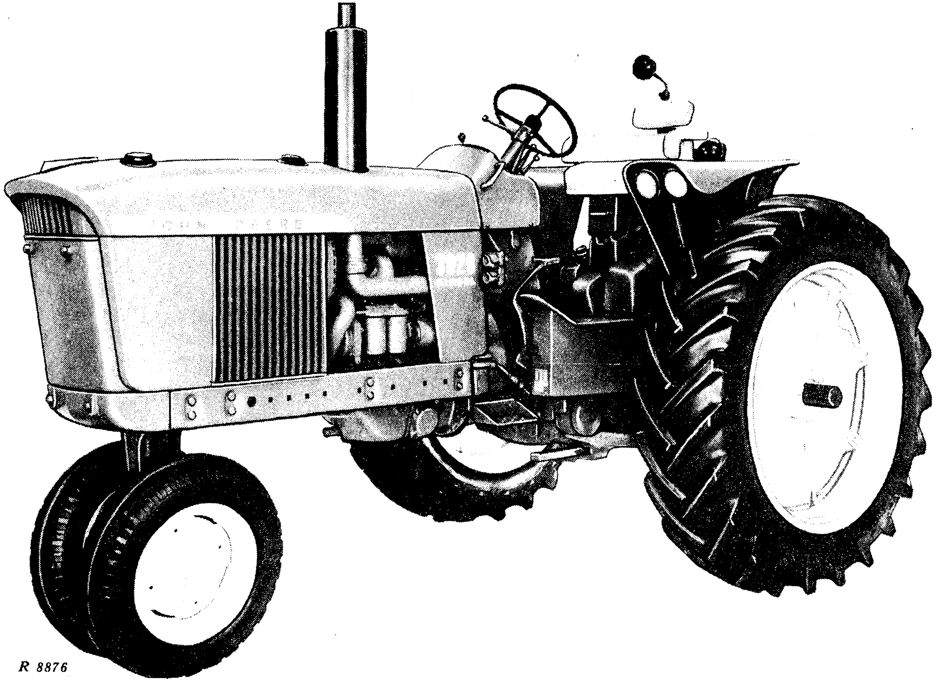
Regular and offset wheels	See page 18
Dual wheels	See page 19

DIMENSIONS	Row-Crop	Standard
Wheel base	90-in.	81-1/2 or 92-3/4 in.
Over-all length	138-1/2 in.	138-1/2 in.
Over-all height	86-5/8 in.	85-1/2 in.
Height to steering wheel	76-3/8 in.	77-1/2 in.
Width (regular axle)	89-5/8 in.	89-5/8 in.
Turning radius	108 in.	110 in.

SHIPPING WEIGHT (With equipment for average field service, less fuel and ballast. Add 330 lbs. if tractor has Power Shift transmission:

	Row-Crop	Standard
Diesel	7399 lbs.	7692 lbs.
Gasoline	7203 lbs.	7496 lbs.
LP-Gas	7373 lbs.	7666 lbs.

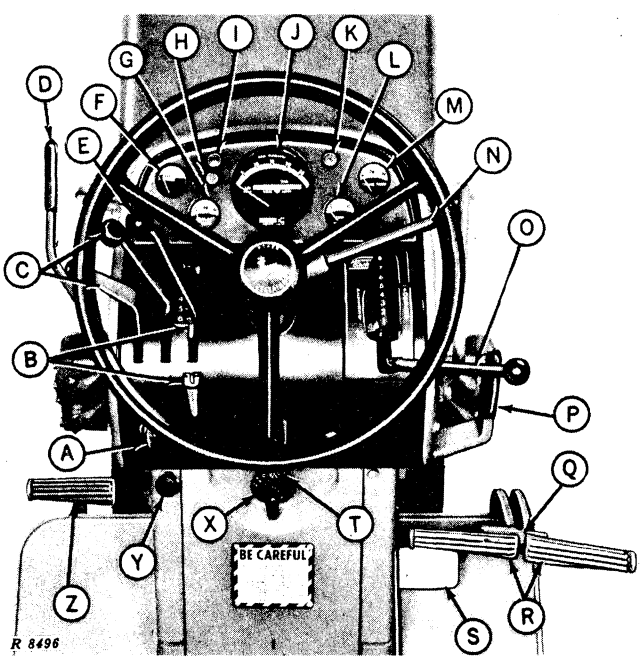
**Additional tires available for special purposes.



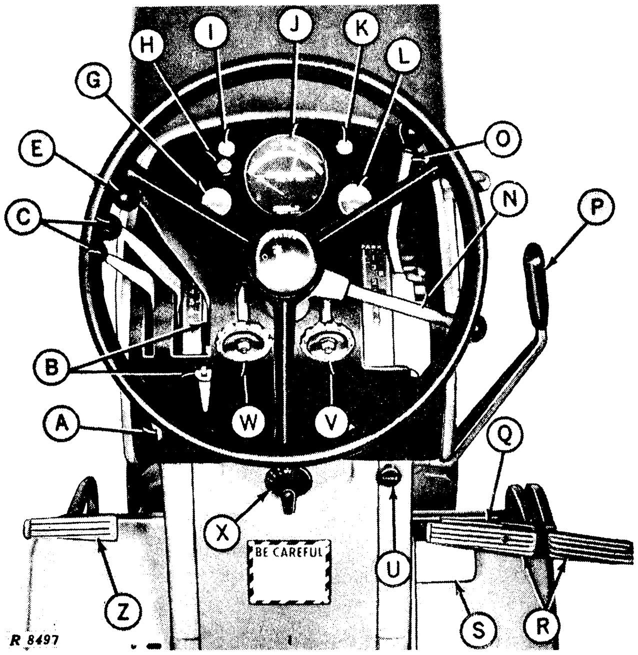
John Deere 3020 Row-Crop Tractor with Diesel Engine and Syncro-Range Transmission

CONTROLS AND INSTRUMENTS

Before attempting to operate your new tractor, become familiar with the location and purpose of its controls and instruments. Study the next few pages carefully, regardless of your previous tractor experience.

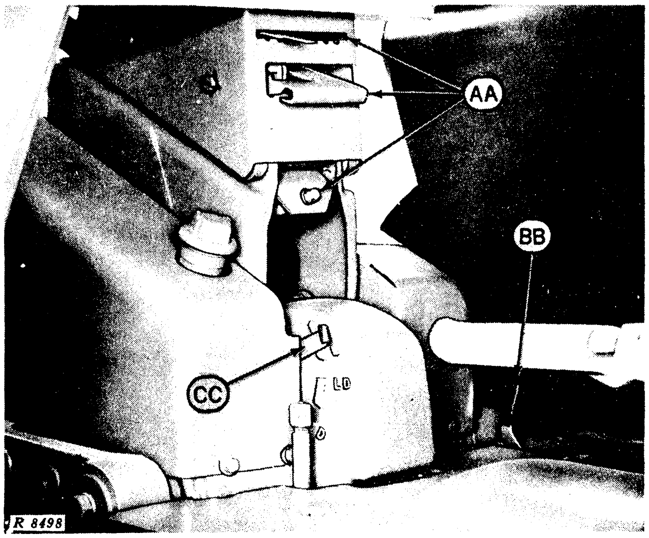


Tractor with Diesel Engine and Power Shift Transmission



Tractor with LP-Gas Engine and Syncro-Range Transmission

A – Key Switch (pages 5, 6, and 10)
B – Rockshaft Control Lever Stop and Lock (page 25)
C – Remote Cylinder Operating Levers (page 32)
D – Engine Disconnect Lever (Power Shift Tractors, page 8)
E – Rockshaft Control Lever (page 25)
F – Transmission Oil Pressure Gauge (Power Shift Tractors, pages 8 and 13)
G – Coolant Temperature Gauge
H – Speed Indicator Knob (page 12)
I – Generator Indicator Light (pages 5 and 6)
J – Speed-Hour Meter (pages 12 and 47)
K – Oil Pressure Indicator Light (pages 5 and 6)
L – Fuel Gauge
M – Transmission Oil Temperature Gauge (Power Shift Tractors, page 13)
N – Hand Throttle (page 9)
O – Shift Lever (Syncro-Range Tractors, page 14)
Speed Selector (Power Shift Tractors, page 12)
P – Power Take-Off Clutch Lever (page 37)
Q – Brake Coupler Bar (page 16)
R – Brake Pedals (page 16)
S – Foot Throttle (page 10)
T – Ether Starting Fluid Adapter (Diesel Tractors, page 7)
U – Engine Choke Knob (Gasoline and LP-Gas Tractors, page 6)
V – Vapor Withdrawal Valve (LP-Gas Tractors, page 6)
W – Liquid Withdrawal Valve (LP-Gas Tractors, page 6)
X – Light Switch (page 23)
Y – Lever Latch Knob (Power Shift Tractors, page 8)
Z – Clutch Pedal (Syncro-Range Tractors, page 14)
Inching Pedal (Power Shift Tractors, page 12)



AA – Seat Controls (page 11)
BB – Tow Lever (Power Shift Tractors, page 15)
CC – Rockshaft Selector Lever (page 26)

OPERATION

Complete instructions for operating your tractor safely and efficiently are given on the following pages. By following these directions carefully, you can be sure that you are taking full advantage of the many features built into your tractor.

OPERATING THE ENGINE

PRESTARTING CHECKS

Perform the following checks and services before starting the engine for the first time each day:

(1) Check the engine crankcase oil level-see page 50.

(2) Check the radiator coolant level - see page 50.

(3) Change the air cleaner oil when the dirt level exceeds 3/8-inch - see page 50. If tractor has a precleaner, check the collector bowl - see page 50.

(4) If tractor has a fuel pump, check the sediment bowl - see page 51.

(5) Grease the wide-swing drawbar rollers, Hi-Crop rear axles, and the Roll-O-Matic or wide front axle grease fittings - see page 51.

(6) Grease the front wheel bearings if the tractor has been operated in extremely wet or muddy conditions - see page 51.

STARTING THE DIESEL ENGINE

NOTE: If the prevailing temperature is 40 degrees Fahrenheit or lower, it may be necessary to use a cold weather starting aid to start the engine (page 7).

Perform the Prestarting checks listed above.

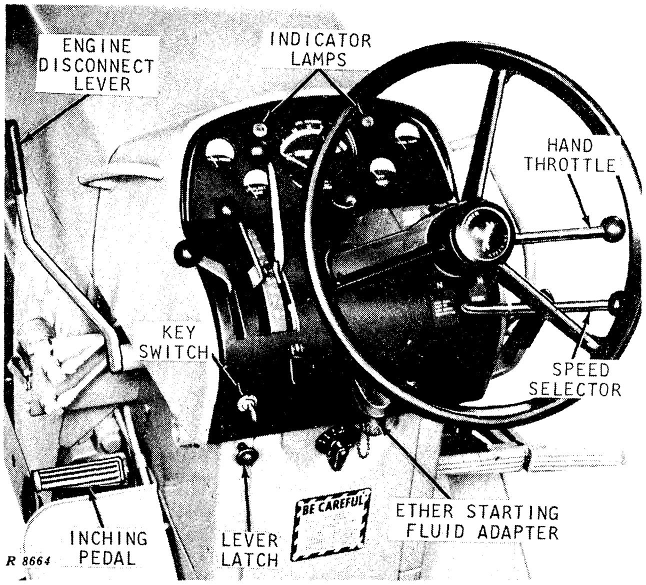
(1) Make sure the fuel shut-off valve on the bottom of the fuel tank is open—see page 58.

(2) See that the shift lever or the speed selector is in the "PARK" position. Depress the clutch pedal or the inching pedal.

(3) PLACE THE HAND THROTTLE IN THE 1200 RPM POSITION, approximately one-third of its travel downward.

(4) Turn the key switch clockwise to the first position. Both indicator lights should glow. If either light fails to glow, turn off the key switch and determine the cause.

(5) Turn the key switch all the way to the right to start the engine. Do not hold the key switch in start position for more than 30 seconds at a time. To do so may overheat the starter. If the engine does not start the first time, wait for a minute or two before trying again. If it does not start after four such attempts, refer to "Trouble Shooting" (page 75).



Diesel Starting Controls

If the key switch is released before the engine starts, wait until the starter stops before turning the switch again. This will prevent possible damage to the starter.

On Syncro-Range transmission tractors the shift lever must be in neutral, or on Power Shift transmission tractors the inching pedal must be depressed before the starter will operate.

(6) After the engine starts, the generator and oil pressure indicator lights should go out. If either light continues to glow when the engine is running faster than 800 rpm, stop the engine and determine the cause. Leave key switch in the on position so the indicator lights will function.

On tractors with Power Shift transmission, check to see that the transmission oil pressure gauge indicates oil pressure. Operating the engine when gauge shows insufficient pressure may damage the tractor. See pages 8 and 13.

STARTING THE GASOLINE ENGINE

Perform the Prestarting checks listed on page 5.

(1) Make sure the fuel shut-off valve on the bottom of the fuel tank is open—see page 58.

(2) See that the shift lever or the speed selector is in "PARK" position. Depress the clutch pedal or the inching pedal.

(3) PLACE THE HAND THROTTLE IN THE 650 RPM POSITION, all the way up with the knob in.

(4) When the prevailing temperature is below 60 degrees Fahrenheit and the engine is cold, pull out on the engine choke knob.

NOTE: At extremely low temperatures it may be necessary to use a cold weather starting aid (page 8).

(5) Turn the key switch clockwise to the first position. The generator and oil pressure indicator lights should glow. If either light fails to glow, turn the key switch off and determine the cause.

(6) Turn the key switch all the way to the right to start the engine. Do not hold the key switch in start position for more than 30 seconds at a time. To do so may overheat the starter. If the engine does not start the first time, pull the hand throttle down SLIGHTLY and wait a minute or two before trying again. If it does not start after four such attempts, refer to "Trouble Shooting" (page 75).

If the key switch is released before the engine starts, wait until the starter stops before turning the switch again. This will prevent possible damage to the starter.

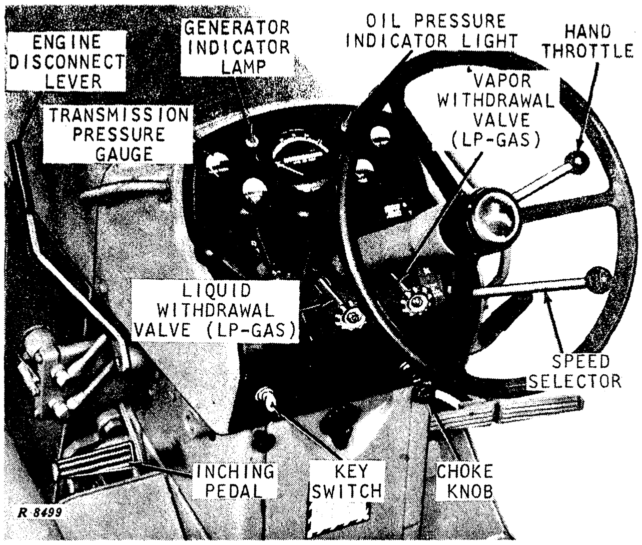
On Sycro-Range tractors, the shift lever must be in neutral, or on Power Shift tractors, the inching pedal must be depressed before the starter will operate.

(7) As soon as the engine starts, push the choke knob in. During cold weather, it may be necessary to leave the choke partially on for the first few minutes.

(8) As the engine begins to run, check to see that the oil pressure and generator indicator lights go out. If either light continues to glow when the engine is running faster than 700 rpm, stop the engine and determine the cause.

On tractors with Power Shift transmission, check to see that the transmission oil pressure gauge indicates oil pressure. Operating the engine when gauge shows insufficient pressure may damage the tractor. See pages 8 and 13.

STARTING THE LP-GAS ENGINE


ENGINE DISCONNECT LEVER
GENERATOR INDICATOR LAMP
OIL PRESSURE INDICATOR LIGHT
HAND THROTTLE
VAPOR WITHDRAWAL VALVE (LP-GAS)
TRANSMISSION PRESSURE GAUGE
LIQUID WITHDRAWAL VALVE (LP-GAS)
SPEED SELECTOR
INCHING PEDAL
KEY SWITCH
CHOKE KNOB
R 8499

Starting Controls on Gasoline and LP-Gas Tractors with Power Shift Transmission

Perform the Prestarting checks listed on page 5.

(1) See that the shift lever or speed selector lever is in "PARK" position. Depress the clutch pedal or inching pedal.

(2) PLACE THE HAND THROTTLE IN THE 650 RPM POSITION, all the way up with the knob in.

(3) Open the vapor withdrawal valve slowly. If the valve is opened too fast, it may cause the excess flow valve (inside the withdrawal valve) to close and prevent normal flow of vapor. If this happens, close the vapor withdrawal valve and open it more slowly.

(4) Turn the key switch clockwise to the first position. The generator and oil pressure indicator lights should glow. If either light fails to glow, turn off the key switch and determine the cause.

(5) Turn the key switch all the way to the right to start the engine.

On Syncro-Range tractors, the shift lever must be in neutral, or on Power Shift tractors, the inching pedal must be depressed before the starter will operate.

(6) In cold weather, if the engine does not start immediately, PLACE THE HAND THROTTLE IN THE 500 RPM POSITION (page 9). While the starter is cranking the engine, pull the choke knob out slowly until the engine fires regularly. Leave the choke in this position and slowly advance the hand throttle. Gradually push the choke knob in. DO NOT OVER-CHOKE.

NOTE: At low temperatures, it may be necessary to use a cold weather starting aid (page 7).

Do not hold the key switch in the start position for more than 30 seconds at a time. To do so may overheat the starter. If the engine does not start the first time, wait for a minute or two before trying again to allow the starter to cool. If the engine does not start after four such attempts, refer to "Trouble Shooting" (page 75).

If the key switch is released before the engine starts, wait until the starter stops before turning the switch again. This will prevent possible damage to the starter.

(7) As the engine begins to run, check to see that the oil pressure indicator light and generator indicator light go out. If either light continues to glow when the engine is running faster than 700 rpm, stop the engine and determine the cause.

On tractors with Power Shift transmission, check to see that the transmission oil pressure gauge indicates oil pressure. Operating the engine when gauge shows insufficient pressure may damage the tractor. See pages 8 and 13.

(8) Operate the engine on vapor until the cooling system is warm. Then slowly open the liquid withdrawal valve and close the vapor valve. Opening the liquid withdrawal valve too fast may cause the excess flow valve to close and prevent normal flow of liquid. If this happens, close the withdrawal valve and open it more slowly.

R 2206

CAUTION: Before starting the tractor engine, be sure there is plenty of ventilation. Never operate the tractor in a shed or garage.

COLD WEATHER STARTING AIDS

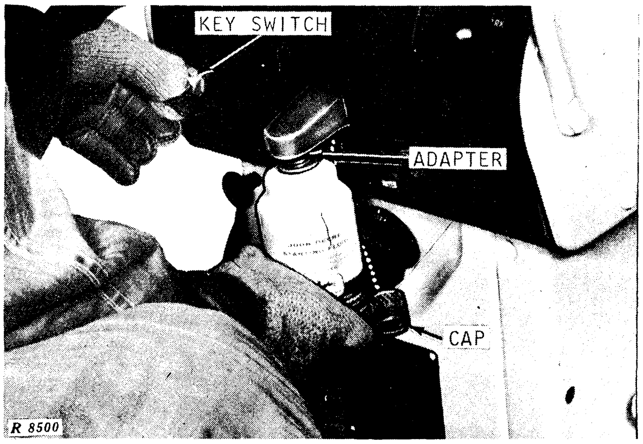
For cold weather starting, the diesel tractor is equipped with an ether starting fluid adapter. The Power Shift transmission tractor is equipped with an engine disconnect lever. Other starting aids are available from your John Deere dealer.

These aids are effective at low temperatures, only when the engine is otherwise operating satisfactorily. They will not correct such deficiencies as low battery charge, crankcase oil of heavy viscosity, and high electrical resistance which may prevent the engine from starting.

ETHER STARTING FLUID ADAPTER (Diesel Tractors)

The diesel tractor is equipped with this adapter which is used to inject atomized starting fluid into the engine air intake system. Pressurized cans of starting fluid are available from your John Deere dealer.

To use the can of starting fluid, remove the safety cap and plastic spray button from the can. Remove the cap from the adapter and position the can under the adapter.



Injecting Starting Fluid

To inject starting fluid, push up on the can.

CAUTION: To avoid damage, turn engine with starter one or two revolutions before injecting starting fluid and inject starting fluid only while the engine is turning.

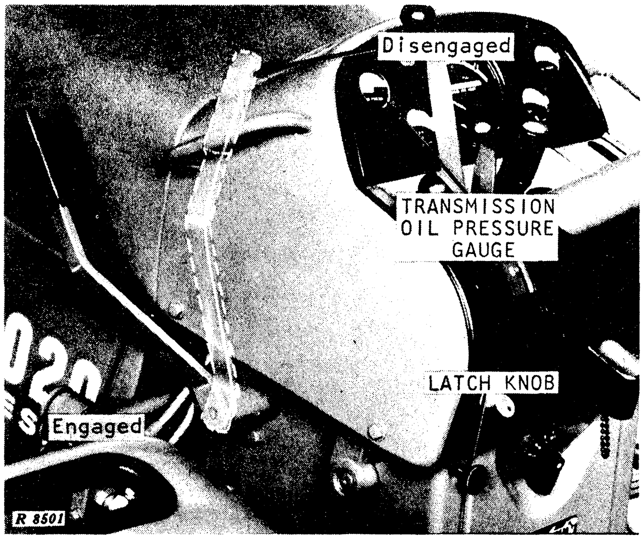
Relax pressure on the can between "shots" of starting fluid. Stop injecting fluid after the engine starts. If the engine begins to die during the first few minutes of operation, inject another "shot" of fluid. When the engine is operating satisfactorily, remove the can from the adapter and replace the safety cap on the can.

Be sure to install the cap on the adapter when it is not in use. This will prevent dust from being drawn into the engine.

Store starting fluid cans where they will not be subject to extreme cold or warm temperatures. For best results, store fluid at room temperature.

CAUTION: Ether starting fluid is highly flammable.

ENGINE DISCONNECT LEVER (Power Shift Tractors)



Engine Disconnect Lever

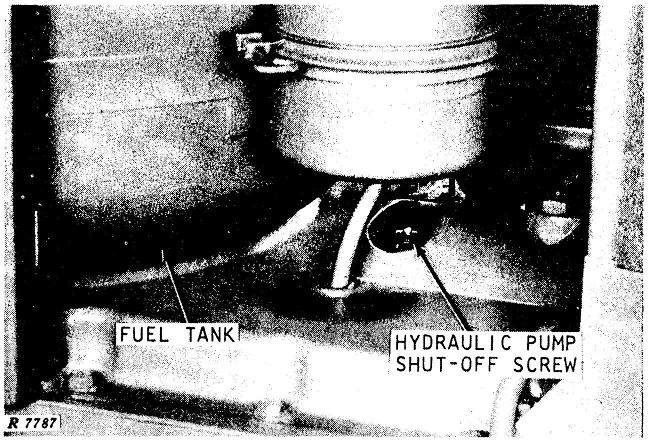
During cold weather, the starter speed on Power Shift tractors may be increased by disengaging the engine disconnect lever so that the transmission will not turn. To do so, pull the lever rearward until it is latched in the disengaged position.

Immediately after starting the engine, engage the lever by pulling it slightly rearward while pulling out on the latch knob. Hold the knob out and allow the lever to move forward to the engaged position. Release the latch knob. The transmission oil pressure gauge should indicate oil pressure (pages 5 and 13).

CAUTION: Operating the engine with the engine disconnect lever disengaged will damage the tractor. Be sure to engage it as soon as the engine starts. Never attempt to start the engine of a Power Shift tractor by towing or pushing the tractor.

SHUTTING OFF HYDRAULIC PUMP

If the tractor has a hydraulic pump shut-off screw (available from your John Deere dealer), the starter speed may be increased during cold weather by shutting off the hydraulic pump so it will not build up pressure. To do so, turn the shut-off screw in (clockwise) one turn with a screwdriver. Then turn the screw in by hand until resistance is felt. Turn the screw in one more turn.

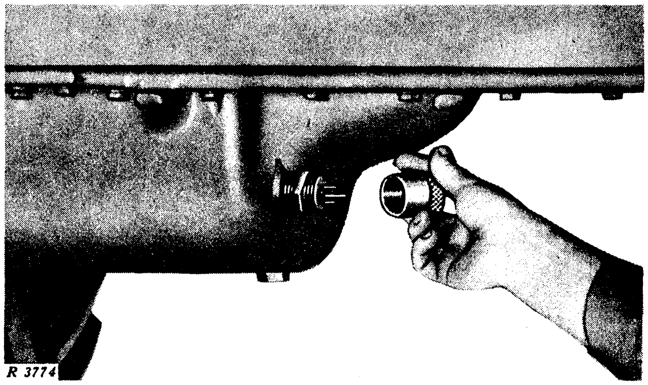


Hydraulic Pump Shut-Off Screw

After the engine has started, use a screwdriver to back the shut-off screw all the way out (turn the screw counter-clockwise). The pump will now build up pressure.

NOTE: Oil will leak past the shut-off screw if it is not backed all the way out against the internal stop.

CRANKCASE OIL HEATER



Removing Cap from Crankcase Oil Heater

To facilitate cold weather starting, a 240-watt, 115-volt electrical crankcase oil heater may be installed in the engine oil pan. To remove the electrical connector from the heater, press the release lever in the connector.

ADDITIONAL BATTERIES

Starting the engine in cold weather can be made easier by connecting an additional 12-volt battery or batteries in parallel with the 12-volt battery or batteries on the tractor.

Use jumper cables to connect the positive (+) terminals of the booster batteries to the positive (+) terminals of the tractor batteries and the negative (-) terminals of the booster batteries to the negative (-) terminals of the tractor batteries. See your John Deere dealer for tractor-mounted booster batteries.

BATTERY WARMER

This warmer is used to warm the battery, permitting it to furnish electrical current to the starter efficiently in cold weather.

Place the battery warmer under the battery in the battery compartment and plug the cord from the warmer into any convenient 115-volt electrical source. If it was necessary to disconnect the battery, be sure to connect the battery cables properly (page 68).

TRACTOR WARM-UP PERIOD

Always be sure the tractor is warmed up properly before operating under a full load.

A good way to do this is first to idle the engine at about 1500 rpm for 5 minutes and then operate it at about 1900 rpm for another 5 minutes.

It is good practice to operate the tractor for the first 30 minutes in a lower gear than is normally required for the load. This gives the oil a chance to circulate freely and prevents undue wear on engine or transmission parts.

ENGINE IDLING

Avoid unnecessary engine idling. Prolonged engine idling may cause the engine coolant to fall below its normal range. This in turn causes crankcase oil dilution, due to incomplete fuel combustion, and permits formation of gummy deposits on valves, pistons, and piston rings. It also promotes rapid accumulation of engine sludge and unburned fuel in the exhaust system.

When the tractor is to remain idle for a considerable length of time, stop the engine.

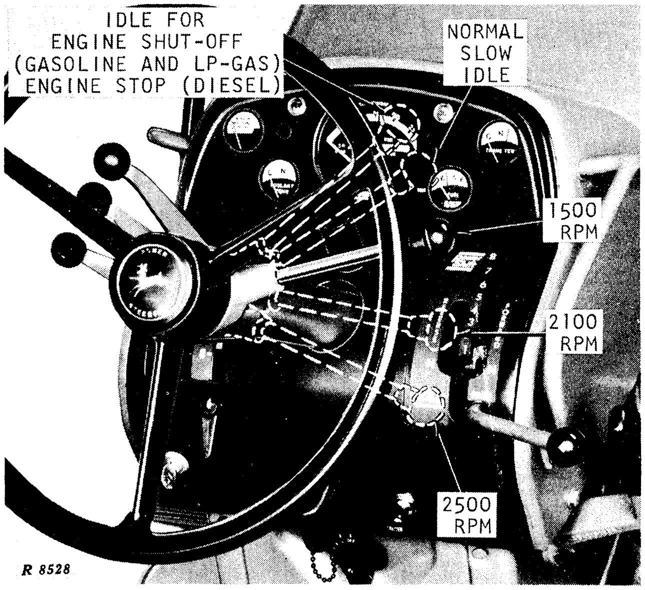
ENGINE SPEEDS

The tractor engine is designed to operate at working speeds ranging from 1500 to 2500 rpm. The engine can be operated at any speed in the working range to meet various operating conditions. Operate the engine at 2100 rpm to obtain the SAE rated PTO speeds.

Normal slow idle is approximately 600 rpm. On a gasoline tractor, a 420 rpm idle speed is provided for engine shut-off. The engine shut-off idle speed is 500 rpm on a LP-Gas tractor.

To check engine speeds, see page 55.

USING HAND THROTTLE


IDLE FOR ENGINE SHUT-OFF (GASOLINE AND LP-GAS) ENGINE STOP (DIESEL)
NORMAL SLOW IDLE
1500 RPM
2100 RPM
2500 RPM
R 8528

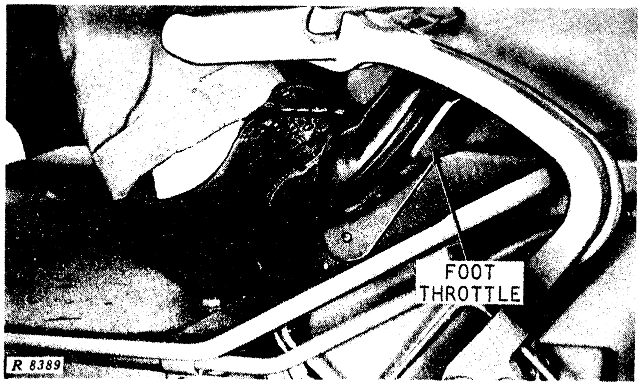
Range of Hand Throttle Positions

Use the hand throttle to select slow idle or any of the variable governed speeds from 1500 to 2500 rpm.

Push the throttle upward as far as it will go to obtain the normal slow idle speed (600 rpm for diesel tractors and 650 rpm for gasoline or LP-Gas tractors). To obtain the idle speed for engine shut-off on gasoline or LP-Gas tractors, pull out on the knob on the hand throttle and push the throttle upward as far as it will go. To obtain 2100 rpm load speed, pull the throttle downward to the first stop. Placing the throttle halfway between slow idle and 2100 rpm gives the 1500 rpm speed. Engine speeds between 1500 and 2100 rpm may be selected by moving the lever between these two positions.

To obtain working speeds above 2100 rpm, pull out on the knob at the end of the hand throttle. With the knob pulled out, pull the throttle downward as far as it will go. This is the 2500 rpm load speed position. Engine speeds between 2100 and 2500 rpm may be selected by moving the lever between these two positions.

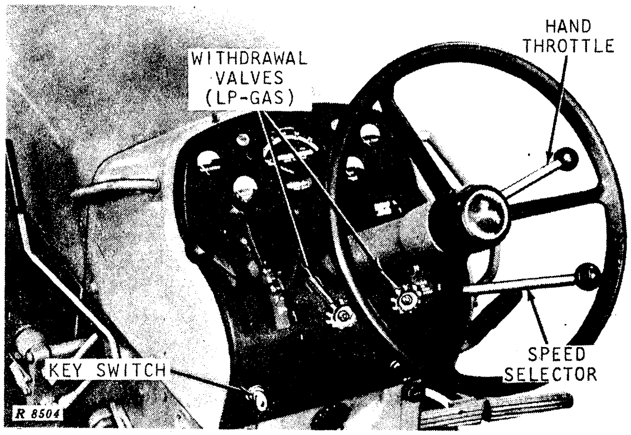
USING FOOT THROTTLE



Operating the Foot Throttle

The foot throttle is used to raise engine speed momentarily. When the foot throttle is pushed all the way downward, the engine operates at 2500 rpm load speed.

STOPPING THE ENGINE



Stopping Controls

Place the shift lever or speed selector in "PARK" and allow the engine to idle a few minutes. Sudden stopping of a hot engine may allow some parts to overheat momentarily and cause possible damage.

DIESEL ENGINES

Pull out on the hand throttle knob and push the throttle up into the engine stop position. Turn the key switch off.

GASOLINE ENGINES

Pull out on the hand throttle knob and push the throttle up into the idle position for engine shut-off. Stop the engine by turning the key switch off.

LP-GAS ENGINES

Close the withdrawal valves and let the engine run until all fuel is exhausted from the lines and the engine stops. Turn the key switch off.

CAUTION: Never leave liquid fuel in the lines with the withdrawal valves closed. To do so can damage the fuel system. Never leave the tractor with the valves open.

ALL ENGINES

After stopping the engine, remove the key from the switch to prevent tampering and unauthorized operation. Removing the key also prevents battery discharge in the event that the switch was accidently left in the on or the accessory position (counter-clockwise from off).

BREAKING IN THE ENGINE

NOTE: If the coolant temperature rises above the "N" range, operate in a lower gear to reduce the load on the engine.

With the following exceptions, the engine is ready for normal operation:

DIESEL ENGINE

During the first 20 hours, it is not recommended to use the foot throttle or to place the hand throttle in speeds above the 2100 rpm load speed position (page 9). To facilitate break-in, avoid prolonged periods of engine idling, for the first 100 hours of service.

When the sulphur content of the diesel fuel used does not exceed 0.5%, change the engine oil and engine oil filter after the first 100 hours of service (pages 45 and 52).

NOTE: When the sulphur content of the diesel fuel exceeds 0.5%, change the engine oil and oil filter after the first 20 hours of operation.

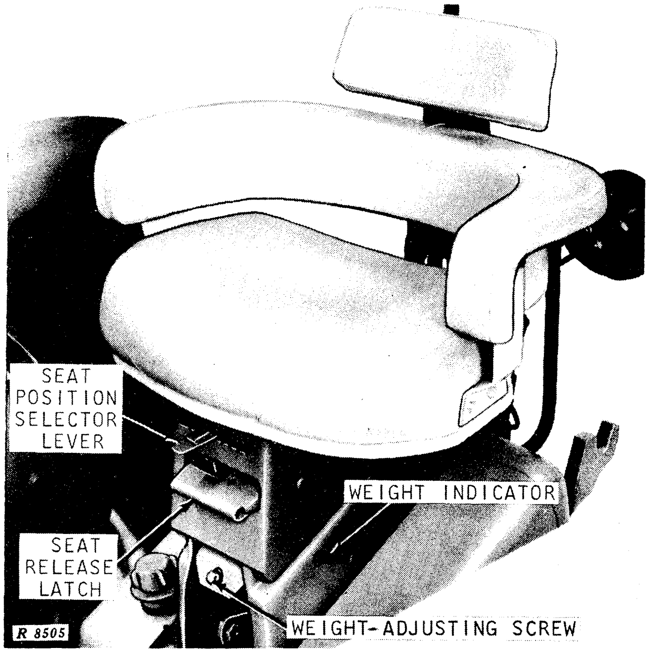
GASOLINE AND LP-GAS ENGINES

During the first 20 hours of service, operate the gasoline or LP-Gas engine at half load with the hand throttle in the 2100 rpm load speed position (page 9). At half load, the engine speed will be approximately 2250 rpm. During the break-in period, it is not recommended to use the foot throttle or to place the hand throttle in speeds above the 2100 rpm load speed position.

After 20 hours, drain the special break-in oil, replace the engine oil filter, and fill the crankcase with the proper oil (page 45). The gasoline or LP-Gas engine is then ready for normal operation.

OPERATING THE TRACTOR

SEAT



Seat Controls

The deluxe, foam-padded suspension seat is equipped with a steel compression spring and shock absorber to provide "Float-Ride" comfort. The semi-circular lower backrest and flexibly mounted upper backrest add to the operator's comfort and safety.

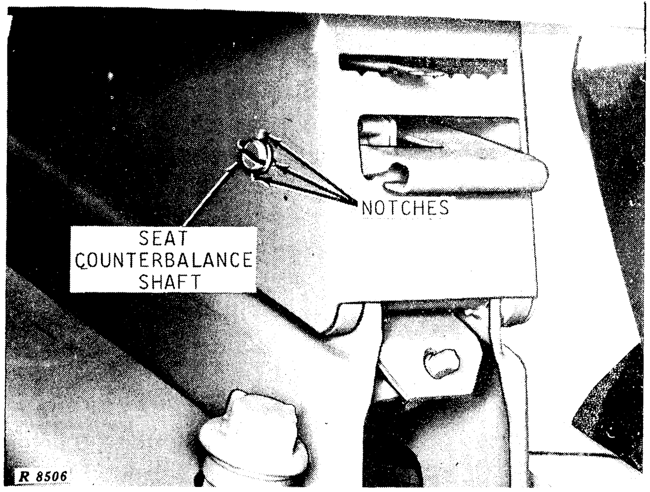
Use only warm water and mild soap to clean the seat cushions. NEVER USE SOLVENTS.

MOVING SEAT TO UPPER REAR POSITION

To move the seat up and back, stand up and lift the seat release latch. The seat will move automatically to the upper rear position. Sit down to return the seat to the normal, preset operating position.

ADJUSTING FOR HEIGHT OF OPERATOR

The normal operating position of the seat can be suited to the height of the individual operator. To make this adjustment, first move the seat to the upper, rear position. Then shift the seat position selector lever between "short" and "tall" until the pedals and levers can be operated comfortably when you are seated. The seat will always return to this position when you sit down after having moved the seat up and to the rear for standing.



Seat Counterbalance Shaft

ADJUSTING FOR WEIGHT OF OPERATOR

You can adjust the tension of the steel compression spring to conform to your weight. This results in the proper amount of comfort and enables the seat to "float" when traveling over rough ground. To make this adjustment, turn the weight-adjusting screw clockwise or counter-clockwise until the indicator on the left-hand side of the seat conforms to your weight.

ADJUSTING COUNTERBALANCE SPRING

If the seat does not move fully to the rear when unlatched, adjust the counterbalance spring as follows. Move the seat to the upper rear position. Insert a screwdriver in the slot in the counterbalance shaft, push in to unlatch the shaft, and turn the shaft counter-clockwise. Align the latch in the end of the shaft with one of the pairs of slots in the side of the seat support and pull the screwdriver outward to latch the shaft.

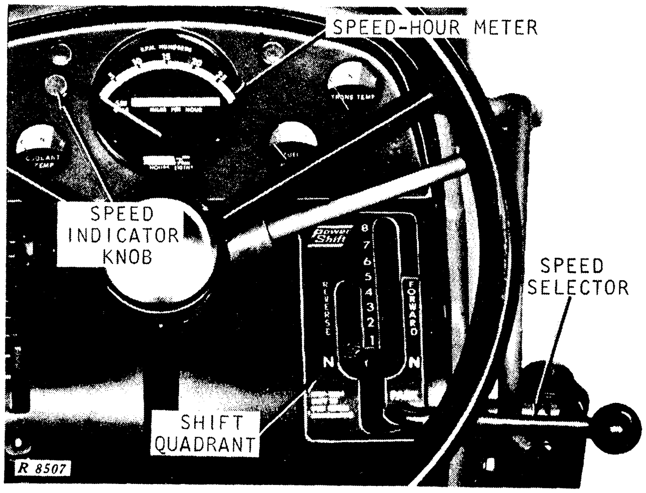
SELECTING GROUND SPEED

Both transmissions provide eight forward speeds for each of the throttle positions that may be used. The Syncro-Range transmission has two reverse speeds, and the Power Shift transmission has four. These combinations enable the operator to balance speed and power for maximum economy and allow him flexibility to meet varying working conditions. For example, at a given ground speed the operator may choose to work in a low gear at high engine speed for maximum reserve power or in a higher gear at a lower engine speed for maximum fuel economy.

Examples of the ground speeds at which the tractor will travel are shown below. Engine working speeds may be varied between 1500 rpm and 2500 rpm. Tractor ground speeds shown in the chart are only for engine speeds of 1500, 2100, and 2500 rpm.

Turn the speed indicator knob on the instrument panel until the gear selected shows on the speed indicator. The speed-hour meter needle will now indicate the tractor ground speed in miles per hour.

Avoid overloading the tractor. When this occurs, operate in a lower gear. Overloading causes undue strain on parts, eventually resulting in poor operation and unnecessary repair expense.



Speed Indicator Knob and Speed Selector

POWER SHIFT TRANSMISSION

SHIFTING

The Power Shift transmission can be shifted "on the go" or when the tractor is stopped by moving the speed selector to the desired gear. It is not necessary to use the inching pedal when starting out or when shifting.

To move the tractor forward, move the speed selector from neutral to the desired gear in the right-hand or forward side of the quadrant. Progressive shifting (one gear at a time) will result in smoother speed change.

TRACTOR GROUND SPEEDS IN MILES PER HOUR

NOTE: The ground speeds shown in this chart are for Row-Crop tractors with 15.5-38 rear tires that have a loaded radius of 28.5 inches. Standard and Hi-Crop tractors have similar ground speeds.

Gear	1500 Rpm		*2100 Rpm		2500 Rpm	
	Syncro-Range	Power Shift	Syncro-Range	Power Shift	Syncro-Range	Power Shift
1st	1.2	1.1	1.7	1.6	2.0	1.9
2nd	1.9	1.6	2.6	2.2	3.1	2.6
3rd	2.4	2.5	3.4	3.4	4.1	4.1
4th	3.1	3.2	4.4	4.4	5.2	5.3
5th	3.8	4.1	5.4	5.7	6.4	6.8
6th	5.1	5.3	7.2	7.4	8.6	8.8
7th	6.4	7.0	9.0	9.8	10.1	11.7
8th	10.5	11.7	14.7	16.3	17.6	19.5
1st reverse	2.4	1.3	3.3	1.8	. . .	. . .
2nd reverse	3.7	1.8	5.2	2.6	. . .	. . .
3rd reverse	. . .	2.9	. . .	4.0	. . .	. . .
4th reverse	. . .	3.7	. . .	5.2	. . .	. . .

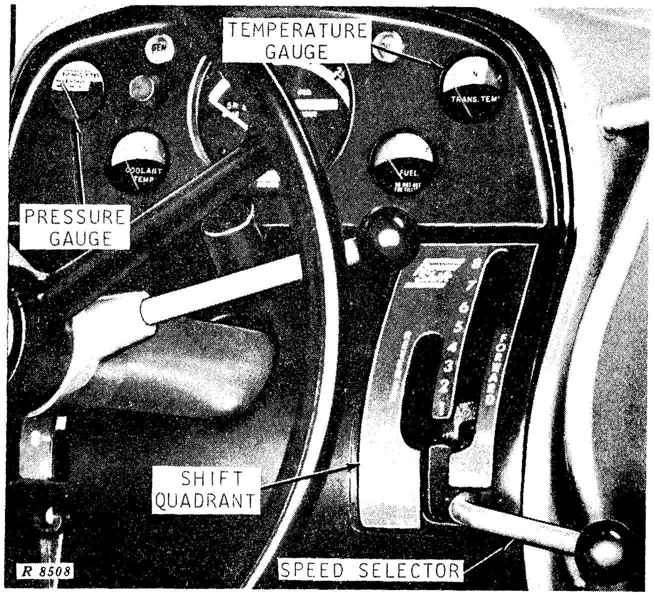
**2100 engine rpm gives the SAE rated 540 or 1000 rpm PTO speed. Some PTO-driven implements are operated at other speeds. See the implement operator's manual for detailed instructions.*

To reverse the tractor, move the speed selector rearward progressively (one gear at a time) to neutral. Then, move the lever to first gear in the left-hand or reverse side of the quadrant. A hand rail beside the speed selector may be used as an aid to shifting when traveling over rough ground.

Use the inching pedal when making emergency stops, when hitching to an implement, or whenever slower clutch engagement is required.

Reduce engine speed prior to making sudden extreme speed changes.

OPERATION



Transmission Instruments and Speed Selector

When operating a tractor with a Power Shift transmission, check the transmission oil pressure gauge and the transmission oil temperature gauge for satisfactory transmission operation.

If the indicator hand on the temperature gauge goes into the red zone, stop the tractor and clean all dirt and trash from the grille screens and the transmission hydraulic oil cooler core. See page 66. Also check for proper transmission-hydraulic oil level. If necessary, fill the system to the proper level. See page 53. If this does not correct the difficulty, call your John Deere dealer. Do not operate the tractor when the temperature indicator hand is in the red zone.

When operating the engine at 2200 rpm, the indicator hand on the transmission oil pressure gauge should be to the right of the minimum transmission pressure line.

The minimum, safe transmission oil pressure will decrease in proportion to engine speed below 2200 rpm. If the pressure is questionable, check it by momentarily running the engine at 2200 rpm.

If the gauge indicates low oil pressure, stop the tractor and check the transmission oil level (see page 53). If the oil level is in the "SAFE" range, the transmission-hydraulic system filters may be clogged and need replacing. See page 55. If this does not correct the difficulty, call your John Deere dealer.

CAUTION: Do not operate the tractor when the transmission oil temperature is too high or the oil pressure is too low.

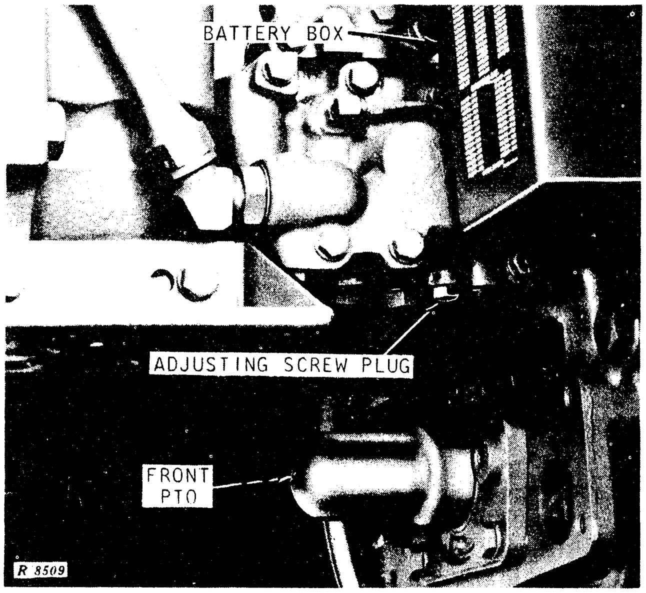
TAKE TIME
to be
SAFE

R 2231

CAUTION: Fast driving is the cause of many accidents. Drive at a safe speed at all times.

SHIFT ADJUSTMENT

The transmission speed-of-shift may be adjusted for rapid shift or for slow, smoother shift. When pulling a heavy load, such as a plow, adjust for a rapid shift to prevent the tractor from stopping while shifting. When pulling a light load, such as a mower, adjust for a slow, smooth shift.



Speed-of-Shift Adjusting Screw Plug

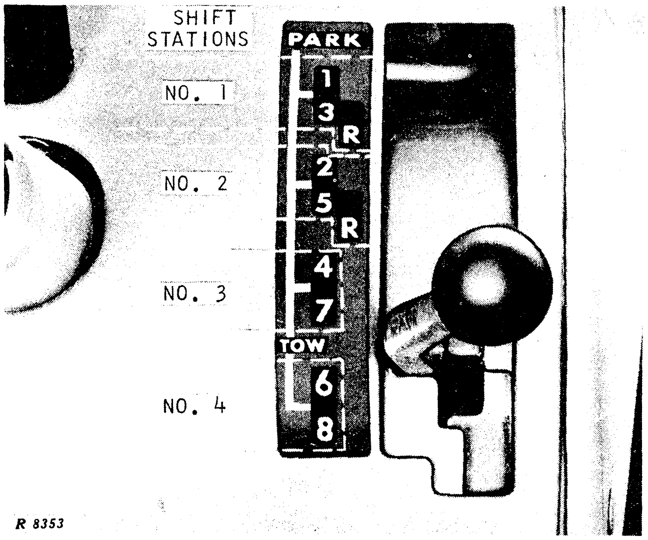
To adjust the speed-of-shift, stop the engine and remove the adjusting screw plug at the bottom of the valve housing on the left-hand side of the tractor. With a screwdriver, turn the adjusting screw in (clockwise) to slow down the shifting. To speed up the shifting for heavy loads, turn the adjusting screw out. Turn the adjusting screw one-half turn at a time until the desired speed-of-shift is obtained.

Install the adjusting screw plug to prevent oil leakage.

SYNCRO-RANGE TRANSMISSION

SHIFTING BETWEEN STATIONS

The shift quadrant has four shift stations. Stations No. 1 and 2 have two forward speeds and one reverse speed. Stations No. 3 and 4 have two forward speeds only.



Syncro-Range Transmission Shift Lever in TOW Position

With the tractor stopped and the clutch pedal depressed, move the shift lever to a neutral position at the left side of the quadrant. Then move the shift lever to the station that has the desired speed. Move the lever to the right and into the speed desired.

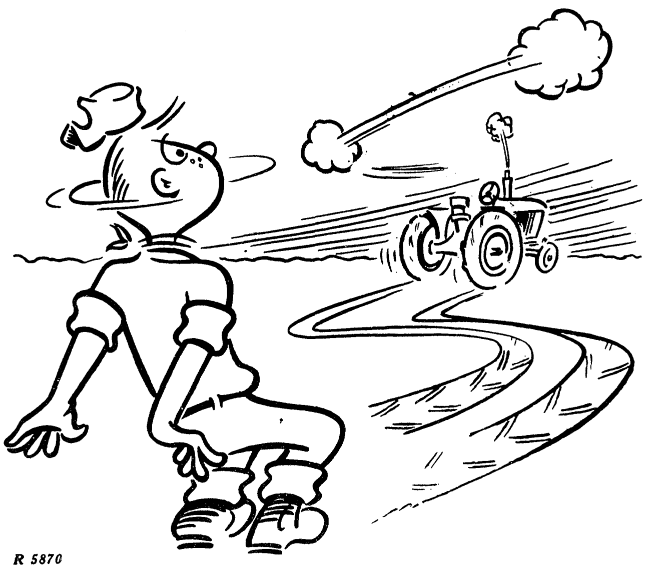
Gradually release the clutch pedal to take up the load smoothly.

SHIFTING WITHIN STATIONS

With the clutch pedal depressed, the transmission can be shifted from one forward speed to the other forward speed within the same station while the tractor is in motion. For instance, you can shift between 1st and 3rd gears, 2nd and 5th gears, 4th and 7th gears, and 6th and 8th gears without stopping the tractor.

You can also shift from a forward speed to the reverse speed within the same station without stopping the tractor. However, to avoid injury and damage to the tractor, do so only at slow ground speed.

Gradually release the clutch pedal to engage the clutch.



R 5870

CAUTION: Whenever the tractor is stopped, place the shift lever or speed selector in the "PARK" position BEFORE DISMOUNTING. Never dismount from the tractor when it is in motion.

PARKING THE TRACTOR

CAUTION: Be sure the tractor is stopped before placing the shift lever or speed selector in the "PARK" position.

SYNCRO-RANGE TRACTORS

On Syncro-Range tractors, move the shift lever to a neutral position at the left side of the quadrant. Then push the shift lever all the way forward into "PARK."

To shift from "PARK" when the tractor is not parked on a steep incline, simply move the shift lever rearward to the station desired. When the tractor is parked on a steep incline it may be necessary to do the following to relieve the load on the transmission park lock. Depress the clutch pedal and pull the shift lever rearward against spring pressure into the No. 1 shift station. Then shift into a forward or reverse gear that will move the tractor UP THE INCLINE. VERY SLOWLY engage the clutch and the transmission will shift out of "PARK."

POWER SHIFT TRACTORS

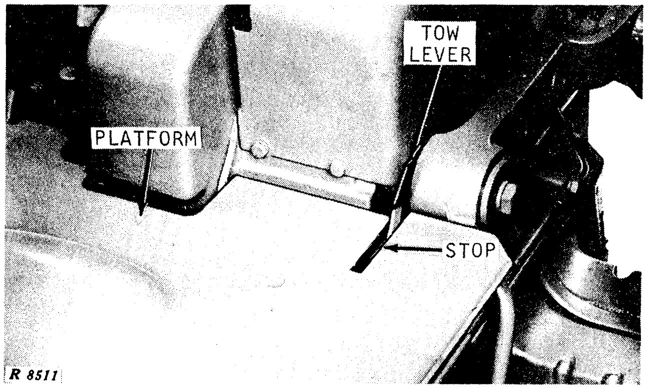
On Power Shift tractors, move the speed selector rearward and to the right into the "PARK" position shown in the illustration on page 13. Shifting from "PARK" to neutral releases the park locking action.

TOWING THE TRACTOR

CAUTION: Never tow the tractor at high speeds. Always attach a tow bar or chain to the tractor frame. When possible, run the engine to maintain hydraulic pressure for power operation of steering and brakes.

POWER SHIFT TRACTORS

When towing a tractor with a Power Shift transmission, move the tow lever to the center of the tractor and forward around the stop until it locks in the "TOW" position. Place the speed selector in the neutral "N" position.



Tow Lever on Power Shift Tractor

When moving the lever out of the "TOW" position to operate the tractor, place the speed selector in "PARK" and move the tow lever rearward, around the stop until the lever locks in the rearward position. It may be necessary to move the tractor slightly, when shifting to "PARK." If tow lever will not move all the way rearward, start the engine while applying pressure rearward to the lever.

CAUTION: To prevent transmission damage, always place the tow lever in "TOW" position when towing Power Shift tractors. Do not tow the tractor to start the engine.

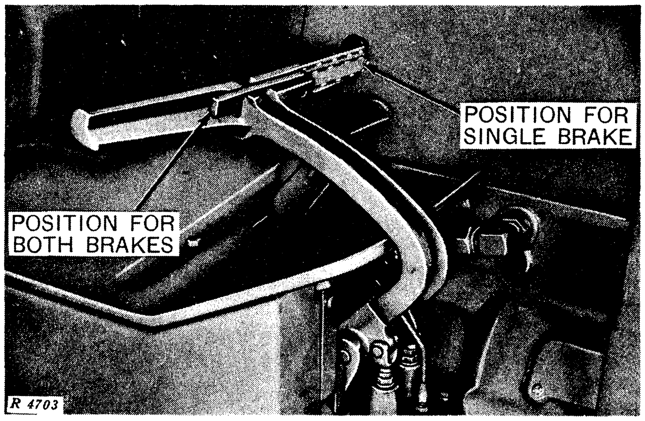
SYNCRO-RANGE TRACTORS

The shift quadrant for the Syncro-Range transmission has a "TOW" position. Whenever a Syncro-Range tractor is to be towed, move the shift lever to this position.

POWER STEERING AND BRAKES

The tractor is equipped with full hydraulic power steering and power brakes so that a minimum of effort will operate the tractor.

To assist in making sharp turns, apply the brakes individually or, to stop the tractor, apply both brakes simultaneously. When traveling at high speeds, couple the pedals together as shown and use a light pressure on the pedals.



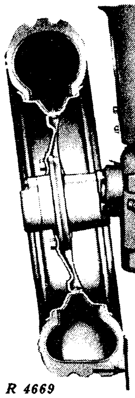
R 4703

Brake Pedals Coupled Together

FRONT WHEEL TREAD

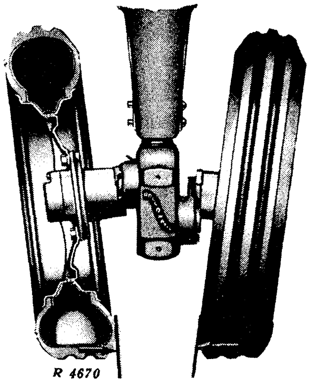
DOUBLE FRONT WHEELS

The double front wheel tread may be set at the narrow spacing or at the wide spacing by reversing the dish of the front wheels.



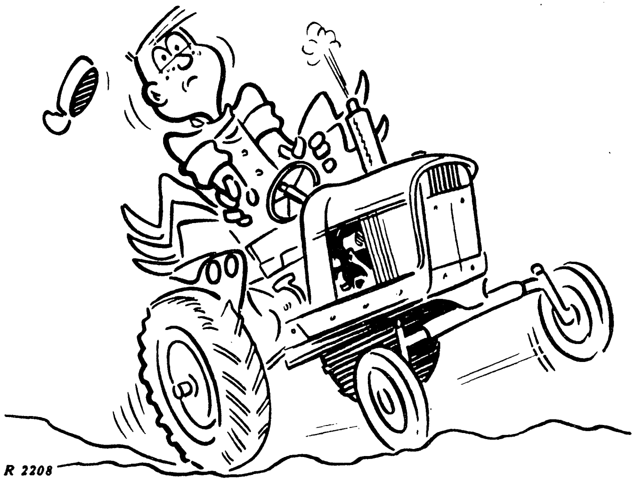
R 4669

Double Front Wheels at Narrow Spacing



R 4670

Double Front Wheels at Wide Spacing



R 2208

CAUTION: Fast driving causes many accidents. Couple the brake pedals together and always drive at a safe speed.

For ease in steering and clearance for front-mounted implements, dish the wheels inward as shown in the illustration. For listed crops where the front wheels are operated on a ridge or for muddy operating conditions where mud has a tendency to "ball up" between the wheels, set the wheels to the wide spacing.

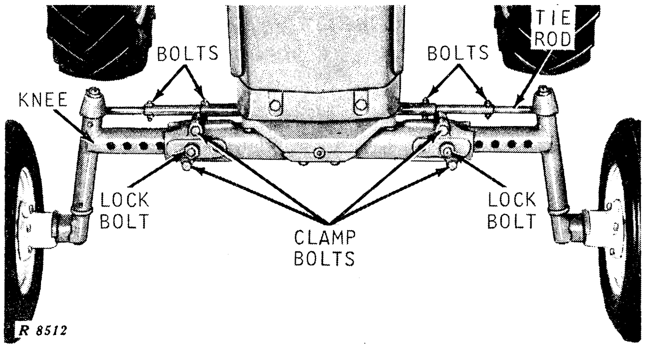
To change the double front wheel spacing, unbolt the wheels from the hubs, reverse the wheels and install them.

WIDE FRONT AXLES

Adjustable-Tread Front Axle

The adjustable-tread front axle is adjustable in 4-inch steps (6-inch steps on Hi-Crop tractors). The following table lists the tread ranges available. Reverse the wheel "dish" in the same way as for double front wheels.

Tractor and Tire	Wheels Dished In	Wheels Dished Out
Row-crop:		
6.00-14 and 6.00-16	48-1/2" to 72-1/2"	58-1/1" to 82-1/4"
7.50-15	50-3/4" to 74-3/4"	55-7/8" to 79-7/8"
Standard	50" to 74"	55-1/4" to 79-1/4"
Hi-Crop	60" to 84"	65-1/4" to 89-1/4"

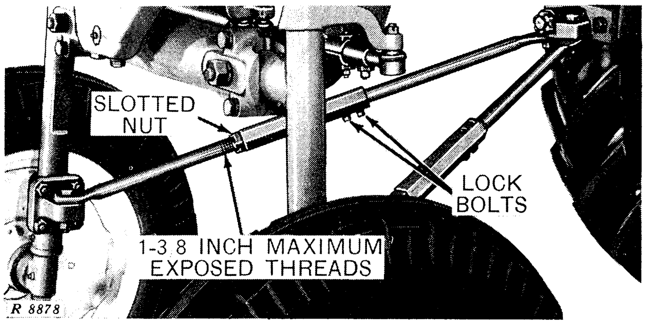


Front Wheel Tread Adjustment (Row-Crop Tractor Illustrated)

To adjust the tread width, jack up the front end of the tractor.

CAUTION: Do not place jack under engine oil pan.

On Hi-Crop tractors with radius rods, loosen the slotted nuts away from the couplings and remove the radius rod coupling lock bolts.



Hi-Crop Radius Rods (Special Equipment)

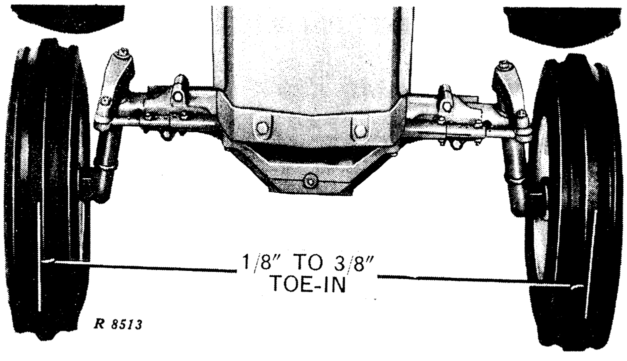
Loosen the clamp bolts and drive the lock bolts from the front axle housing. Remove the bolts from the tie rods and move the front axle knees in or out to give the desired tread width. Install the bolts in the tie rods and axle housing. Tighten the clamp bolts securely (to 300 ft-lbs torque). Coat unpainted surfaces with rust preventive or heavy grease. Check toe-in.

On Hi-Crop tractors with radius rods, adjust the couplings so that the lock bolt holes are aligned. Install the lock bolts and tighten the slotted nuts. The exposed threads on the radius rods must never exceed 1-3/8 inches.

Fixed-Tread Front Axle (Standard Tractor)

The front wheel tread width on a standard tractor with fixed-tread front axle is 55-1/2 inches with the wheels "dished" inward. When the wheels are dished outward, the tread width is 60-3/4 inches. For instructions on reversing the wheel "dish," see page 16.

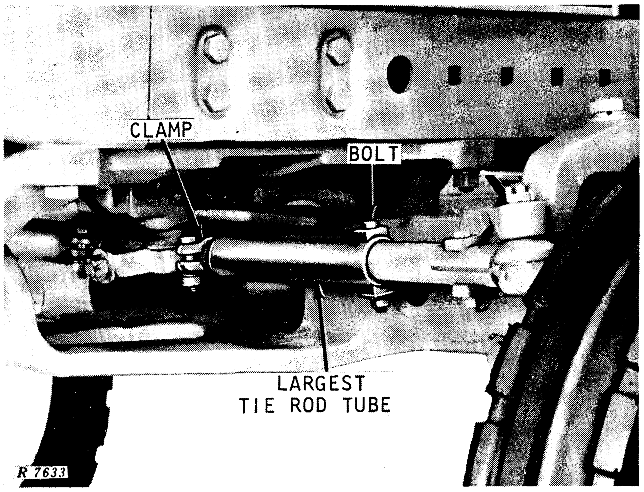
Toe-In Adjustment



Correct Toe-In (Standard Tractor Illustrated)

Toe-in of the front wheels on a tractor with wide front axle should be 1/8 to 3/8 inch.

To check toe-in, turn the steering wheel until the front wheels point straight ahead, parallel to the center line of the tractor. Measure the distance from tire to tire, first at the front of the tires and then at the rear. Front measurement should be 1/8 to 3/8 inch less than rear measurement.



Toe-In Adjustment (Standard Tractor Illustrated)

To adjust toe-in on adjustable tread axles, remove the bolts from the largest tie rod tubes and loosen the clamps on the inner end of the tie rods. On fixed tread axles, loosen the tie rod clamps.

Turn the tie rod tubes in or out until toe-in is correct. Replace the bolts and tighten the clamps. Do not overtighten the clamps. Both wheels must have equal toe-in.

REAR WHEEL TREAD

REGULAR AND OFFSET WHEELS

Range of Adjustment

The tread ranges listed in the following charts are obtained by moving the wheel on the axle by the rack and pinion, by reversing the wheel on the axle, or by changing the rim position on the wheel.

ROW-CROP TRACTORS

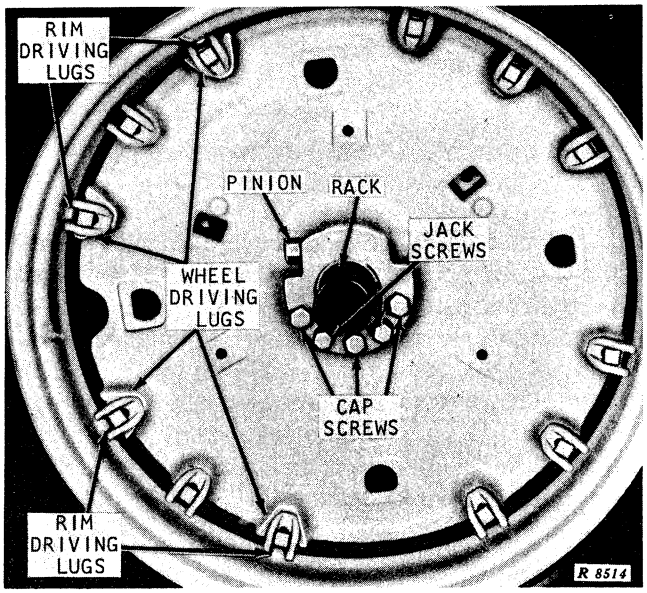
Wheel Type	Axle Type	Possible Tread Widths
Regular	Regular	60'' to 91''
	Long	62'' to 98''
	Extra Long	67'' to 113''
Offset	Regular	60''to 97''
	Long	60'' to 103''
	Extra Long	61'' to 119''

STANDARD AND HI-CROP TRACTORS

Tractor	Axle Type	Possible Tread Widths
Standard	Regular	63'' to 91''
	Long	63'' to 97''
Hi-Crop	Rack	73'' to 97''
	Flanged	60'' to 98''

Rack and Pinion Method

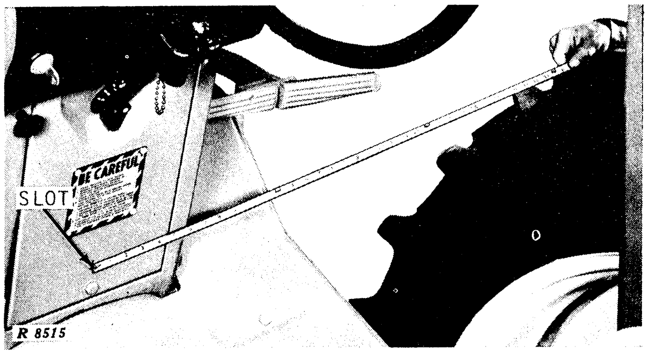
This method of rear wheel tread adjustment is accomplished by turning a pinion gear in the wheel hub. The pinion engages a rack on the axle to move the wheel in or out. The rack and pinion adjustment may be made with one or two wheel weights installed. Remove any additional weights.



Rack and Pinion Adjustment

Rotate the wheel until the rack on the axle is up. Loosen the three cap screws 1/4 to 3/8 inch. To loosen the tapered sleeve, turn the two jack screws clockwise until the inner edge of the hex. surface of each screw is flush with the wheel hub surface.

Jack up the tractor and turn the pinion gear to slide the wheel in or out on the axle. Measure the distance as shown in the illustration.



Measuring Distance from Center of Tractor to Center of Tire

After the desired tread is obtained, back the jack screws all the way out against the stop. Do not force. Lubricate cap screw threads and tighten cap screws securely (300 ft-lbs torque).

CAUTION: Adjusting the wheel too close to the rear axle housing may damage the pinion when the hub is tightened. Also, be sure that the tire or weights will not rub the tractor. The jack screws must be free to turn after the hub is tightened.

Adjust the other wheel in the same manner. Normally, both wheels are set the same distance from the tractor center line. After a few hours of service, RETIGHTEN cap screws and keep them tight.

Reversing Wheel on the Axle

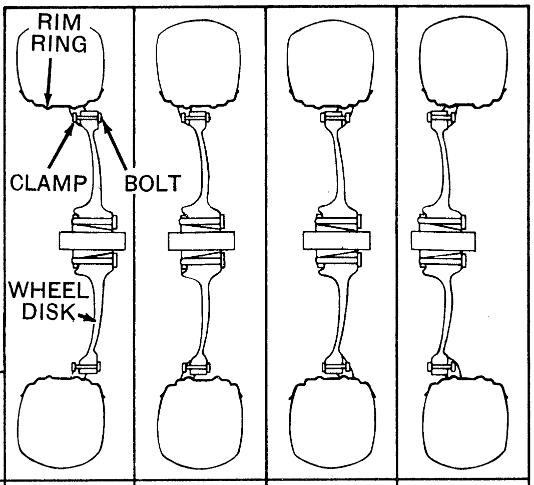
On tractors with offset wheels, the rear wheel tread may be changed by reversing the "dish" of the wheel. To do so, jack up the tractor and remove the wheel. Reverse the "dish" and install the wheel. Be sure to maintain the proper direction of tire rotation.

Changing Rim Position on Wheel

The rim is held to the wheel by clamps that engage one of the two raised rings around the inside of the rim. Tread adjustment may be accomplished by bolting the clamps to either side of the wheel or by engaging the clamps to either one of the two raised rings on the rim. This gives four possible rim positions on the wheel.

To change the rim position on the wheel, jack up the tractor until there is little or no weight on the tire. Remove the clamps and shift the rim or wheel to the desired position. Install the clamps and tighten evenly. Be sure the clamps on the wheel driving lugs engage the rim driving lugs (see the illustration on page 18).

Hammer each bolt head to seat the bolts. Retighten the clamps securely. Adjust both rear wheels in the same manner. After a few hours service, RETIGHTEN the clamps and keep them tight.


RIM RING
CLAMP
BOLT
WHEEL DISK

WHEEL TYPE	AXLE TYPE	DISK POSITION				
REGULAR WHEEL	*REGULAR AXLE	-----	60"-76"	64"-84"	63"-83"	71"-91"
	LONG AXLE	-----	62"-83"	70"-91"	69"-90"	77"-98"
	EXTRA LONG AXLE	-----	67"-98"	75"-106"	74"-105"	82"-113"
OFFSET WHEEL	REGULAR AXLE	DISH IN	60"-69"	60"-77"	60"-76"	65"-84"
		DISH OUT	67"-82"	75"-90"	74"-89"	82"-97"
	LONG AXLE	DISH IN	60"-76"	64"-84"	63"-83"	71"-91"
		DISH OUT	72"-88"	80"-96"	79"-95"	87"-103"
	EXTRA LONG AXLE	DISH IN	61"-92"	69"-100"	68"-99"	76"-107"
R 8214		DISH OUT	77"-104"	85"-112"	84"-111"	92"-119"

Minimum tread width on standard tractors is 63 inches.

Tread Chart for Row-Crop and Standard Tractors

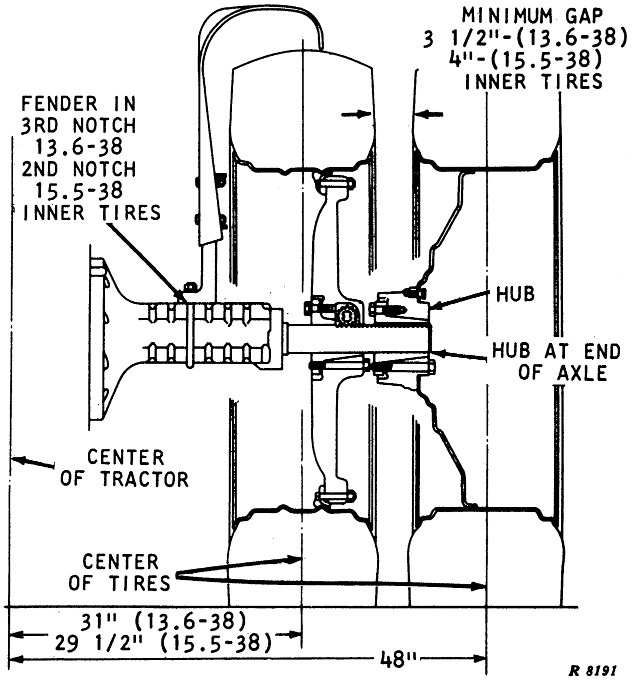
DUAL WHEELS (Row-Crop Tractors Only)

Row-Crop tractors can be equipped with dual wheels. The inner wheel (regular or heavy-duty) can have either 13.6-38 or 15.5-38 tires. The outer steel rim and disk wheels have 13.6-38 tires and are attached to a cast hub on the axle.

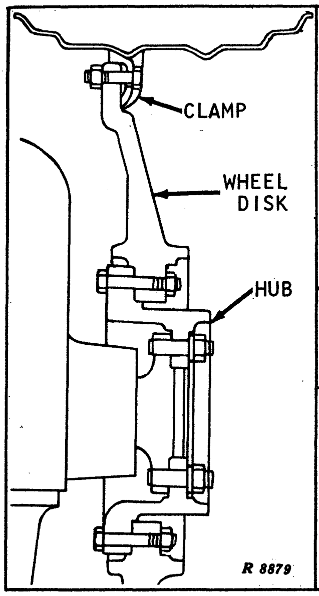
Position each fender and dual wheel as shown in the illustration with outer dual hub at end of axle; never beyond. With proper rear wheel treads the gap between the tires will be 3-1/2 inches with 13.6-38 inner tire or 4 inches with a 15.5-38 inner tire. Insufficient gap can damage the tires.

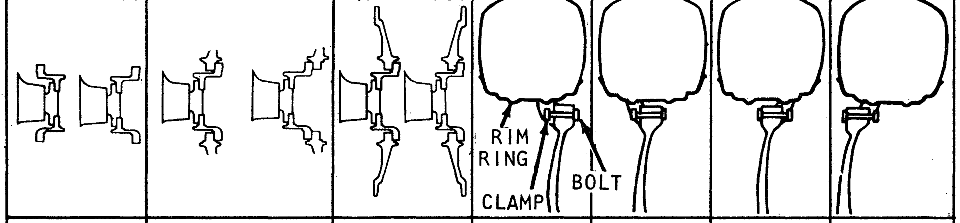
It is very important that inner wheel rim nuts and hub cap screws be securely tightened because outer wheel must be removed to retighten them. Tighten outer steel wheel disk cap screws to 80 ft-lbs torque.

CAUTION: NEVER operate tractor with a loose wheel, rim, or hub.


MINIMUM GAP
3 1/2"-(13.6-38)
4"-(15.5-38)
INNER TIRES
FENDER IN
3RD NOTCH
13.6-38
2ND NOTCH
15.5-38
INNER TIRES
HUB
HUB AT END OF AXLE
CENTER OF TRACTOR
CENTER OF TIRES
31" (13.6-38)
29 1/2" (15.5-38)
48"
R 8191

Dual Wheels



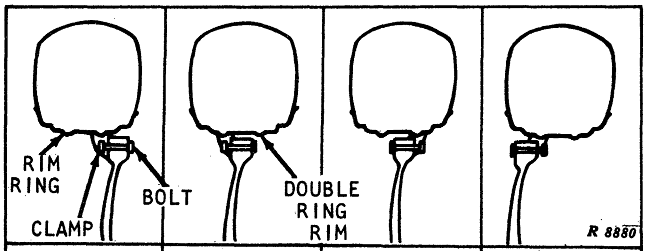


HUB TURNED IN OR OUT	WHEEL DISK INSIDE OR OUTSIDE OF HUB	WHEEL DISK DISHED IN OR OUT	CLAMP POSITION ON WHEEL AND RIM			
HUB IN	DISK OUTSIDE	DISHED IN	60"	64"	68"	72"
		DISHED OUT	68"	72"	76"	80"
HUB OUT	DISK INSIDE	DISHED IN	70"	74"	78"	82"
		DISHED OUT	78"	82"	86"	90"
	DISK OUTSIDE	DISHED IN	78"	82"	86"	90"
		DISHED OUT	86"	90"	94"	98"

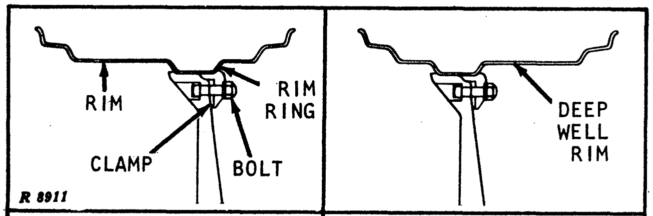
Tread Chart for Hi-Crop Tractors with Flange-Type Axles

HI-CROP TRACTORS

The tread settings on a Hi-Crop tractor with a flange-type axle are obtained by the four methods shown in the tread chart above. The tread settings for Hi-Crop tractors with a rack-type axle are shown in either of the following charts depending on whether the tractor has double ring rim or a deep well rim. See page 18 for instructions on changing rear wheel tread.



72"-82"	80"-90"	79"-89"	87"-97"



73"-83" *82"-89"	81"-91" *90"-97"

Wheels reversed on the axle.

Tread Charts for Hi-Crop Tractors with Rack-Type Axles

TIRES

Properly inflated tires are important to the operation of your tractor and materially affect tire service life. The amount of air pressure to be carried in the tires depends upon implement used with the tractor and the amount of ballast employed. Keep the tires inflated according to the recommendations shown below.

INFLATION CHARTS

Front Tires			
		Inflation Pressure	
Tire Size	Ply	With Towed or Rear-Mounted Implement	With Front-Mounted Implement
6.00-16	6	36 lbs.	48 lbs.
6.50-16	6	32 lbs.	44 lbs.
7.50-15	6	28 lbs.	36 lbs.
7.50-16	6	28 lbs.	36 lbs.
7.50-16	10	48 lbs.	60 lbs.
7.50-18	6	28 lbs.	36 lbs.
7.50-20	6	28 lbs.	36 lbs.
11.00-12	12	36 lbs.	56 lbs.

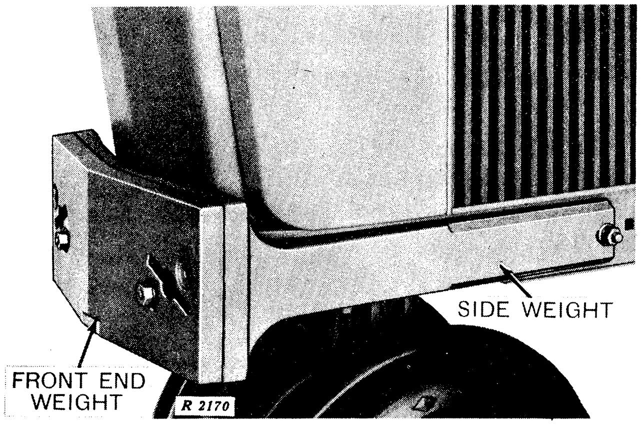
Rear Tires			
		Inflation Pressure	
Tire Size	Ply	With Little or No Added Ballast	With Max. Ballast or Heavy Rear-Mounted Implement
13.6-38	6	14 lbs.	20 lbs.
14.9-38 C&R	6	14 lbs.	18 lbs.
15.5-38	6	14 lbs.	18 lbs.
16.9-30	6	16 lbs.	16 lbs.
16.9-34	6	16 lbs.	16 lbs.
18.4-30	6	16 lbs.	16 lbs.
18.4-34	6	16 lbs.	16 lbs.

BALLAST

The performance of your tractor can be improved under certain conditions by adding or reducing the ballast at the front end or at the rear wheels.

FRONT END AND SIDE WEIGHTS

When operating with a heavy rear-mounted implement or when operating on hilly terrain, install front end and side weights for adequate steering control and stability.



Front End and Side Weight Installed

Two side weights, and up to eight front end weights may be added. Each of the weights, available from your John Deere dealer, weighs 85 pounds.

The side weights are installed first. The front end weights stack on the front portions of the two side weights. Rotate each weight 180 degrees with respect to the preceding weight to line up the mounting holes.

Front end ballast cannot always maintain the required stability if the tractor is driven too fast over rough ground with heavy rear-mounted tools in the raised position. Play safe and drive slowly under these conditions.

REAR WHEEL WEIGHTS

Power can be wasted and tire life cut drastically by excessive rear wheel slippage. Wheel slippage can be reduced to a minimum by weighting the rear wheels with a liquid solution in the tires or with cast-iron wheel weights.

When the tractor is pulling its rated load, ballast should not be added to the point where all wheel slippage is eliminated. When too much weight is used, the tread marks will be clear and distinct. When too little weight is used, the tread marks will be obliterated.

Maximum Ballast

When the ballast given in the following chart is added, the tire will be carrying its rated load. When ballast is added, adjust the tire pressure as shown in the inflation charts.

RATED TIRE CARRYING CAPACITY

*Tire Size	Added Ballast Per Rear Wheel		
	Row-Crop	Standard	Hi-Crop
13.6-38	640 lbs.	Not Used	495 lbs.
14.9-38 C&R	1030 lbs.		885 lbs.
15.5-38	830 lbs.		685 lbs.
16.9-30	[Not Used]	950 lbs.	Not Used
16.9-34	1340 lbs.	1200 lbs.	
18.4-30	Not Used	1680 lbs.	
18.4-34		1970 lbs.	1965 lbs.

**Ballast for dual tires is limited by the 3rd gear operating capacity of the tractor.*

Variations from the ballast shown in the chart may be required to meet various field conditions. However, rear wheel ballast should never exceed the weight required to provide traction for loads within the 3rd gear operating capacity of the tractor.

Be sure to remove the additional weight when it is no longer required.

Cast-Iron Weights

Cast-iron weights should be bolted to the rear wheels of your tractor when weight is required in addition to or in place of liquid weight. On standard tractors, three weights may be installed on the inside of the rear wheel disk.

The removable weights are available from your John Deere dealer in two sizes—120 pounds and 140 pounds. The small weights are used next to the wheel on tractors with 30-inch rims where interference may exist between the weight and the rim. The larger weights are used on tractors with 34 or 38-inch rims or as additional weights where no interference exists between the weight and the rim.

When plowing, best results are generally obtained by placing more weight on the land wheel then on the furrow wheel.

Liquid Weight

Water and calcium chloride solution is an economical means of adding weight to the rear wheels. This solution, added in the tire inner tubes, will not damage the inner tube or tire if used in the proper proportions. The addition of calcium chloride is recommended to prevent the water from freezing.

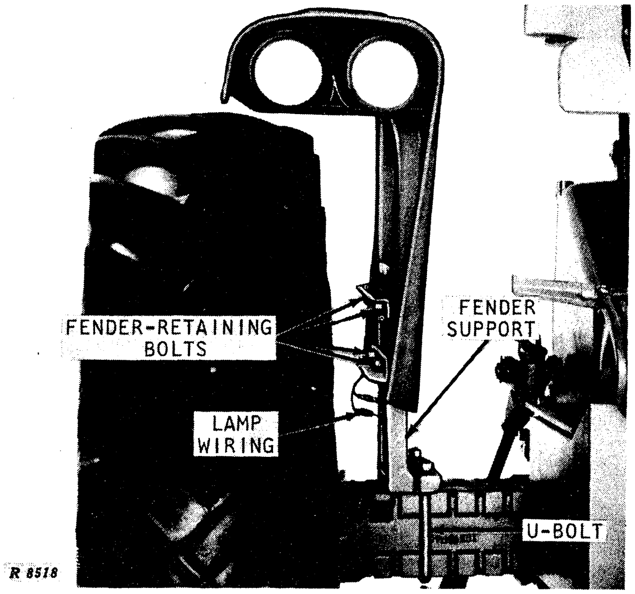
Use of this method of weighting the rear wheels has the full approval of the tire companies. See your John Deere dealer for this service. The following chart lists the liquid weight each tire will hole when 75 percent full (filled to valve level).

LIQUID WEIGHT PER TIRE (75 PER CENT FILLED)

Tire Size	Slush-Free at 13° F.; Solid at -23° F. (Approx. 2 Lbs. CaCl2 Per Gal. Water)	Slush-Free at -12° F.; Solid at -52° F. (Approx. 3.5 Lbs. CaCl2 Per Gal. Water)	Slush-Free at -53° F.; Solid at -62° F. (Approx. 5 Lbs. CaCl2 Per Gal. Water)
13.6-38	480 lbs.	520 lbs.	550 lbs.
14.9-38	602 lbs.	645 lbs.	680 lbs.
15.5-38	611 lbs.	646 lbs.	677 lbs.
16.9-30	612 lbs.	656 lbs.	694 lbs.
16.9-34	672 lbs.	722 lbs.	758 lbs.
18.4-30	800 lbs.	859 lbs.	905 lbs.
18.4-34	874 lbs.	936 lbs.	988 lbs.

FENDERS

The fenders may be moved in or out on the rear axle housing. Fenders with built-in dual headlights may also be moved up or down.



Row-Crop Tractor Fender

To move the fenders in or out along the axle housing, remove the U-bolts. Move each fender and U-bolt to the new position, install the U-bolt, and tighten the retaining nuts securely.

To adjust the height of a fender with dual headlights, remove the fender-retaining bolts. Then slide the fender up or down on the support. When the fender is in the desired position, install and tighten the four fender-retaining bolts. If the tool box was mounted on the fender, install it under the upper fender-retaining bolts.

NOTE: When moving the fenders, be careful not to damage the lamp wiring.

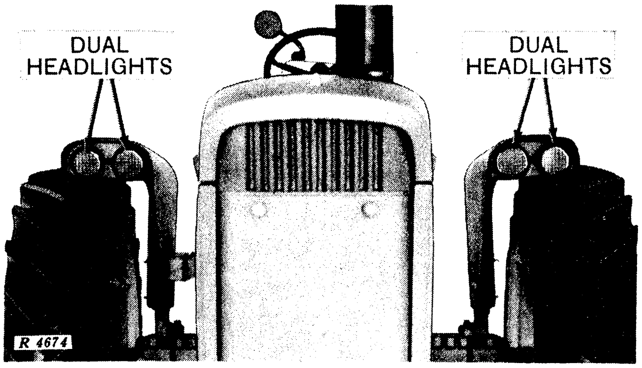
LIGHTS

The lights on your tractor are designed to give the maximum amount of safety and convenience when operating at night or during other periods of low visibility.

HEADLIGHTS

A row-crop tractor without fenders or a standard tractor is equipped with two side-mounted, sealed-beam headlights. One headlight is attached to each bracket extending to either side of the tractor.

Fenders with dual sealed-beam headlights are available for row-crop tractors. The two inner lamps throw strong beams ahead of the tractor. The outer flood lamps illuminate the ground on both sides as well as ahead of the tractor.



Fenders with Built-In Dual Headlights

TAILLIGHT

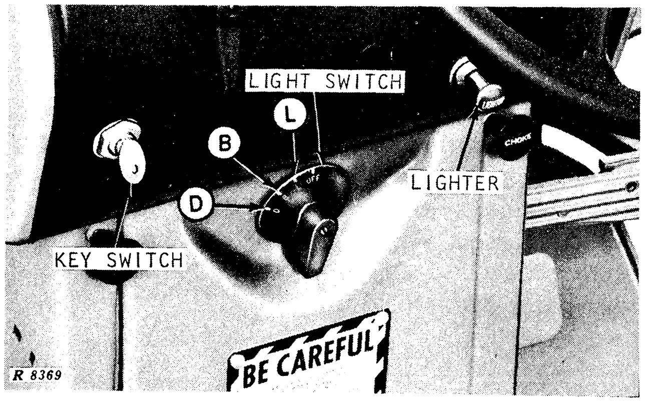
The combination red-white taillight is mounted on a mast behind the seat. It illuminates implements at the rear of the tractor or glows red for night highway travel.

DASH LAMP

The dash lamp illuminates the tractor instrument panel.

LIGHT SWITCH

When the key switch is turned clockwise to the "ON" position, or counter-clockwise to the accessory position (gasoline and LP-Gas tractors only), the light switch will turn on all tractor lights. The switch has four positions.



Light Switch

On a row-crop or standard tractor equipped with two sealed-beam headlights, use the four switch positions as follows:

"OFF" - To turn off all lights.

"L" - To turn on bright headlights and white taillight.

"B" - To turn on bright headlights, red taillight, and red-amber tractor warning lamp (optional).

"D" - To dim the headlights with red taillight and red-amber tractor warning lamp (optional) turned on.

On a row-crop tractor equipped with four sealed-beam headlights (two in each fender), use the four switch positions as follows:

"OFF" - To turn off all lights.

"L" - To turn on all four headlights and white taillight.

"B" - To turn on all four headlights, red taillight, and red-amber tractor warning lamp (optional).

"D" - To dim the headlights by turning off the inner headlights. The outer headlights, red taillight, and red-amber tractor warning lamp (optional) are turned on.

The dash lamp is turned on when the light switch is placed in any of the three operating positions.

Always dim the tractor headlights when meeting a vehicle at night by turning the light switch to "D."

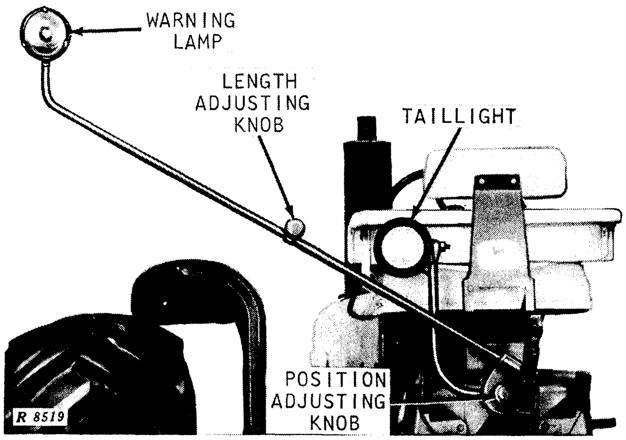
ADJUSTING THE HEADLIGHTS

The headlights on your tractor should be adjusted to illuminate the desired working area at the front and sides of the tractor.

When driving on the highway at night, readjust the headlights sufficiently downward so they will not blind the driver of an oncoming vehicle.

TRACTOR WARNING LAMP

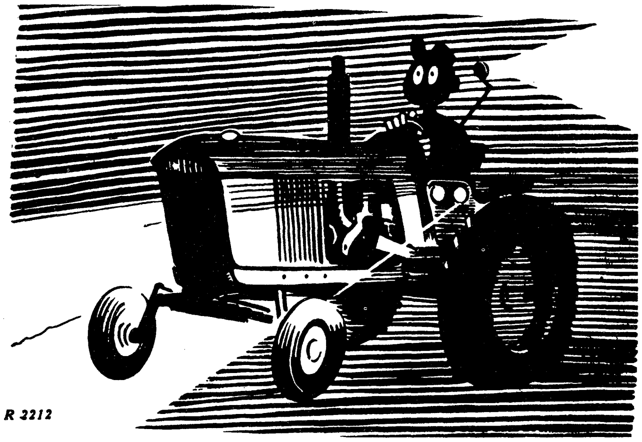
This lamp (which glows amber to the front and red to the rear) is mounted on a telescoping mast at the rear of the tractor. When desired, the lamp may be equipped with a flasher, available from your John Deere dealer.



Tractor Warning Lamp in Extended, Left-Hand Position

When traveling on the highway at night or during periods of low visibility, the telescoping mast may be extended by loosening the length-adjusting knob.

When the mast is in the high vertical position, approaching vehicles on hilly roads will have advance warning. When the extended mast is swung to a position at the left-hand side of the tractor, the passing side is marked even though high towed loads obstruct the regular taillight. To change the mast position, loosen the position-adjusting knob, move the arm to the desired position, and tighten the knob.

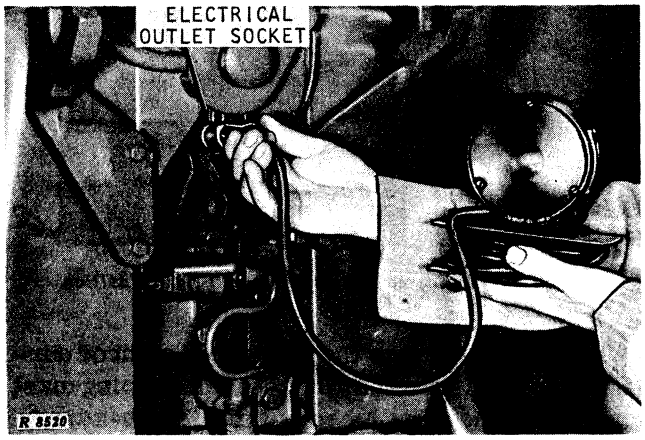


CAUTION: Use warning lamps when driving at night.

IMPLEMENT WARNING LAMP

The implement warning lamp is plugged into the electrical outlet socket at the rear of the tractor and installed on the implement. The lamp will be turned on as long as it's plugged into the socket.

This lamp (which glows red to the rear and amber to the front) mounts securely on the left-hand side of a drawn implement. The lamp may be equipped with a flasher, available from your John Deere dealer.



Connecting Implement Warning Lamp

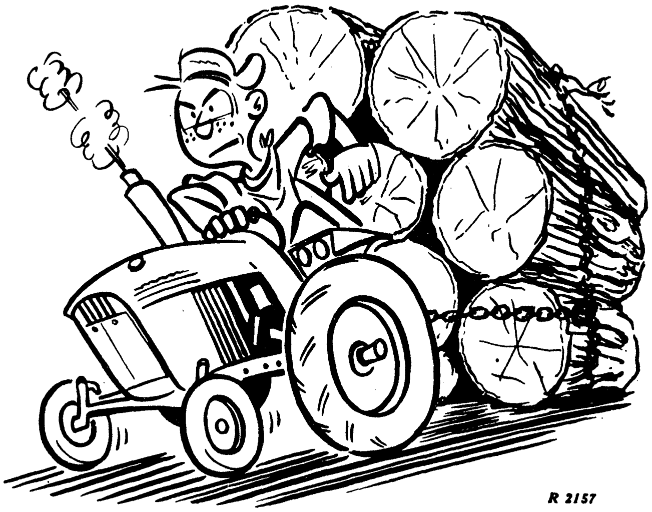
ELECTRICAL OUTLET SOCKET

This socket, a source of 12-volt, DC electrical power, is used for plugging in the implement warning lamp, auxiliary lights, or other electrical equipment. It is located conveniently at the center rear of the tractor.

If accessories drawing more than 3 amperes are plugged into the electrical outlet socket of a diesel tractor, see instructions on page 68 for balancing battery loads.

HIGHWAY DRIVING

When transporting (or driving) the tractor on a road or highway at night or during the day, use accessory lights and devices for adequate warning to the operators of other vehicles. In this regard, check local governmental regulations. Various safety lights and devices such as those illustrated on pages 23 and 24 are available at your John Deere dealer's.



An overloaded tractor will have a short service life.

IMPLEMENT HITCH AND CONTROL SYSTEM

The implement hitch and control system on your tractor provides a quick and easy means for attaching and lifting various implements and for controlling their operation.

The system may include a hydraulically operated rear rockshaft, a 3-Point Hitch (tractor must have a rockshaft), one or two remote hydraulic cylinders, a front rockshaft, a drawbar, or a power take-off.

ROCKSHAFT

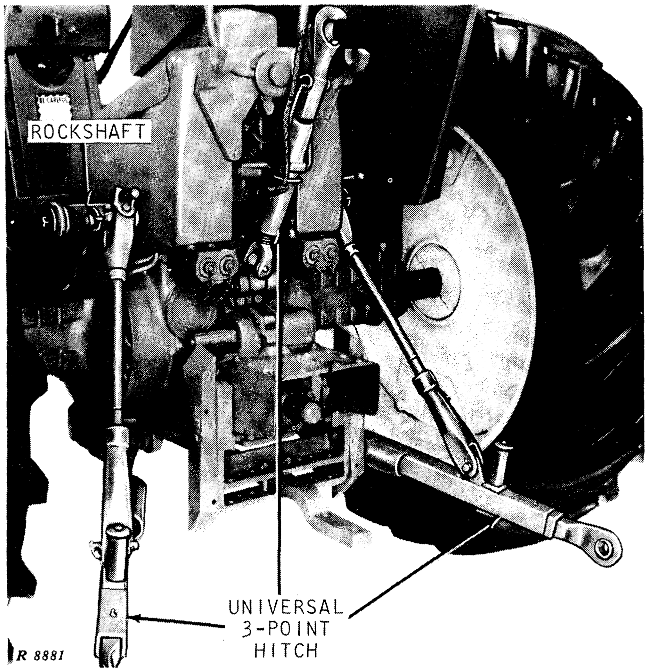
The rear rockshaft can be used to raise, lower, and control a wide variety of integral implements and 3-point hitch tools.

The position of the rockshaft is in relation to position of rockshaft control lever in the quadrant. The rockshaft may be operated whenever the tractor engine is running.

The selector lever position (page 26) determines which implement control system ("Load," "Depth," or "Load-and-Depth") is used.

In "Depth" control, the implement attached to the 3-point hitch will work at the depth selected by the rockshaft control lever, regardless of the amount of pull required.

In "Load" control, the rockshaft automatically raises or lowers the hitch and implements to maintain a constant load through variations in soil density or ground contour.

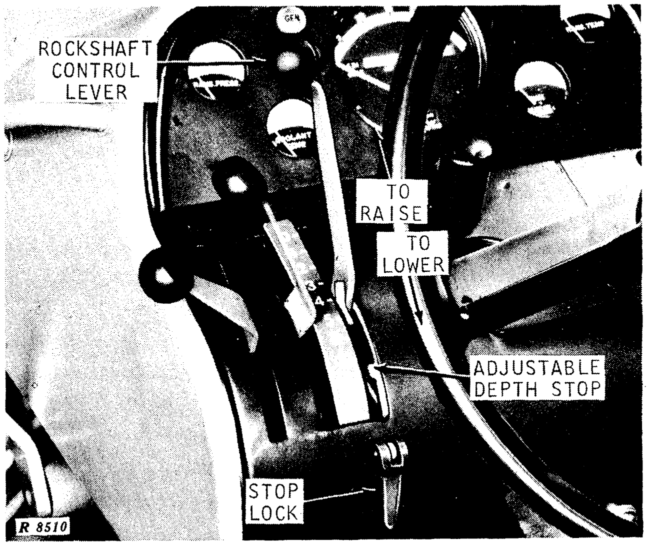


Rockshaft and Universal 3-Point Hitch

In "Load-and-Depth" control, the rockshaft maintains the most uniform implement working depth possible when variations in ground contour are encountered. The "Load-and-Depth" control also boosts traction with only a slight change in working depth. When the load increases, the system lifts up slightly on the hitch and transfers some of the implement weight to the tractor.

Load sensing for the system is accomplished through the 3-point hitch draft links on row-crop tractors and through the center link on Hi-Crop tractors.

USING ROCKSHAFT CONTROL LEVER



Rockshaft Control Lever

The rockshaft control lever is located on the dash. Push the rockshaft control lever forward to raise the implement or pull it rearward to lower the implement.

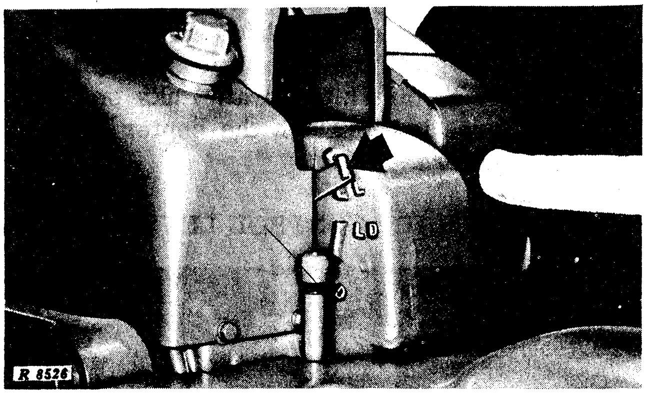
The adjustable depth stop on the quadrant is used to "predetermine" the depth setting of the rockshaft. After a few minutes of operation to determine the desired position, set the stop to limit the rearward movement of the control lever. The implement will return to the exact depth each time it is lowered. To change the position of the depth stop, raise the stop lock and slide the stop to the new position. If the depth stop slips when it is locked, tighten it by raising the lock and turning it 1/2 turn clockwise.

The implement may be lowered further (without shifting the depth stop) by moving the control lever to the left-hand side of the slot and pulling the lever further rearward.

The chart beside the rockshaft control lever serves as a guide when setting the lever.

To obtain "floating action" for rockshaft controlled implements with gauge wheels, place the selector lever located below the seat in the "D" position and pull the control lever all the way back in the quadrant.

SETTING SELECTOR LEVER



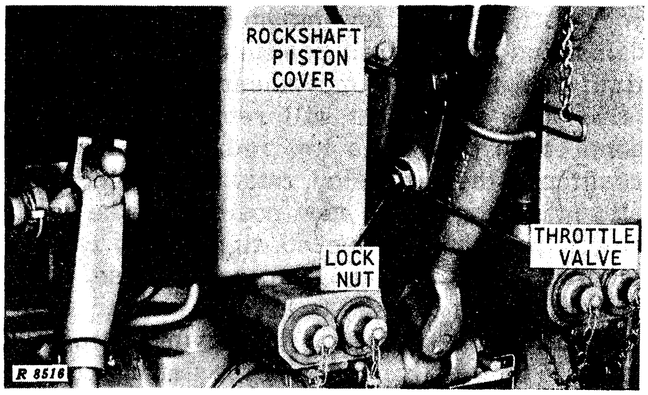
Selector Lever

The selector lever, located below the seat, is used to select the desired implement control, system (see page 25). The "L" (upper) position is used for "Load" control. The "LD" (middle) position is used for "Load-and-Depth" control. The "D" (lower) position is used for "Depth" control.

Before attaching an implement to the 3-point hitch, place the lever in the "D" (lower) position. AFTER the implement is attached, place it in the proper position for the desired control system. (See implement operator's manual.)

ADJUSTING SPEED-OF-DROP

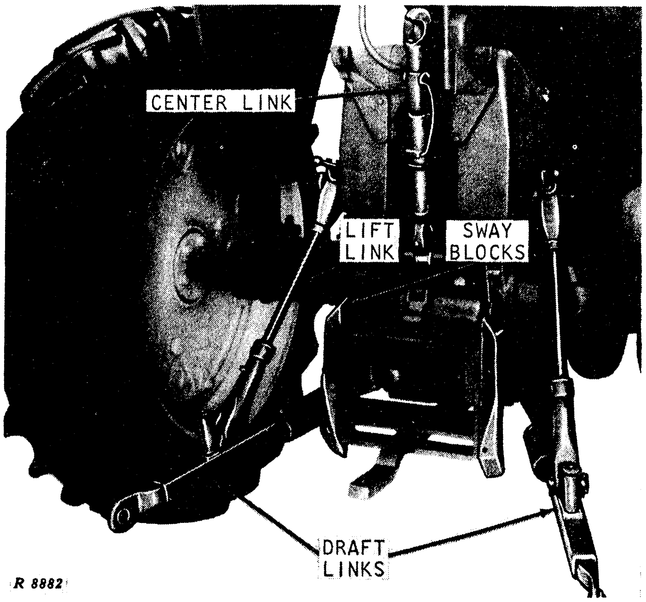
The speed at which the rockshaft and implement will drop is regulated by the throttle valve on the rockshaft piston cover.



Rockshaft Speed-of-Drop Adjustment

To adjust the throttle valve, loosen the lock nut and turn the threaded valve stem in to decrease speed-of-drop or out to increase it. Tighten the lock nut when the speed-of-drop is correct.

UNIVERSAL 3-POINT HITCH
(Row-Crop and Standard Tractors)



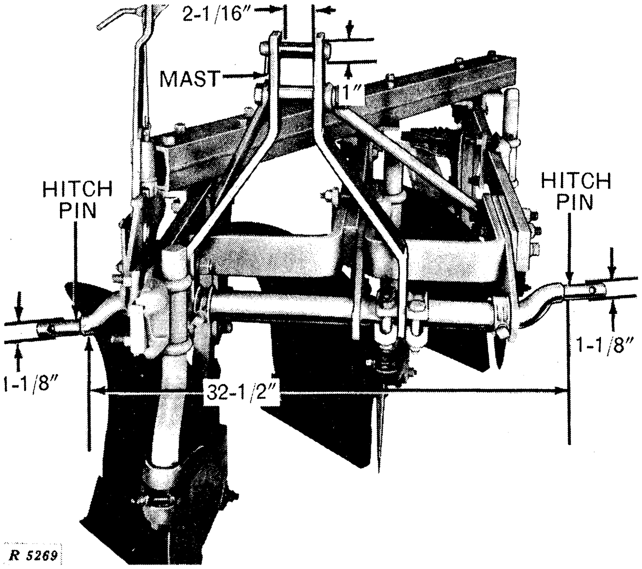
Universal 3-Point Hitch Components

The Universal 3-Point Hitch provides a fast, easy means of attaching integral implements. The rear-mounted 3-point hitch consists of two telescoping draft links, two adjustable lift links which connect the draft links with the rockshaft lift arms, an adjustable center link, and two sway blocks. The rockshaft operates the 3-point hitch.

PREPARING HITCH FOR CATEGORY 1 OR 2 IMPLEMENT

Two classes of implements, referred to as category 1 and category 2, may be attached to a tractor with a 3-point hitch. Implements are grouped in these categories according to the dimensions of their hitch attaching points. These dimensions are shown in the following chart.

Distinguishing Dimensions	Category 1 Implement	Category 2 Implement
Diameter of hitch pins	7/8"	1-1/8"
Distance between shoulders of hitch pin	26-7/8"	32-1/2"
Gap in top of mast	1-3/4"	2-1/16"
Diameter of holes in top of mast	3/4"	1"



Category 2 Implement Hitch Dimensions

The 3-point hitch on your tractor is normally equipped to attach directly to a category 2 implement.

Before attaching a category 1 implement to the 3-point hitch, install bushings in the draft link attaching holes to accommodate the smaller 7/8-inch diameter hitch pins. See your John Deere dealer for these adapting parts.

POSITIONING SWAY BLOCKS

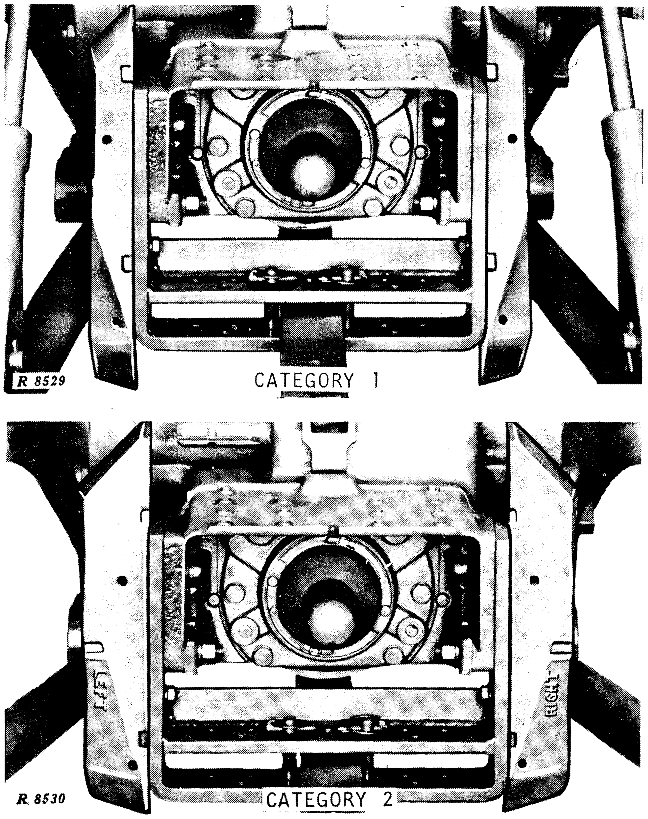
Sway blocks control 3-point hitch and implement side motion. The words "LEFT" and "RIGHT" on the two blocks indicate the proper side of the tractor drawbar support to which each is attached.

Before attaching an implement to the 3-point hitch, make sure the sway blocks are installed properly. Refer to the implement operator's manual for proper sway block location.

If a category 1 implement is to be attached, each sway block is installed with the wide flat surface facing the drawbar support.

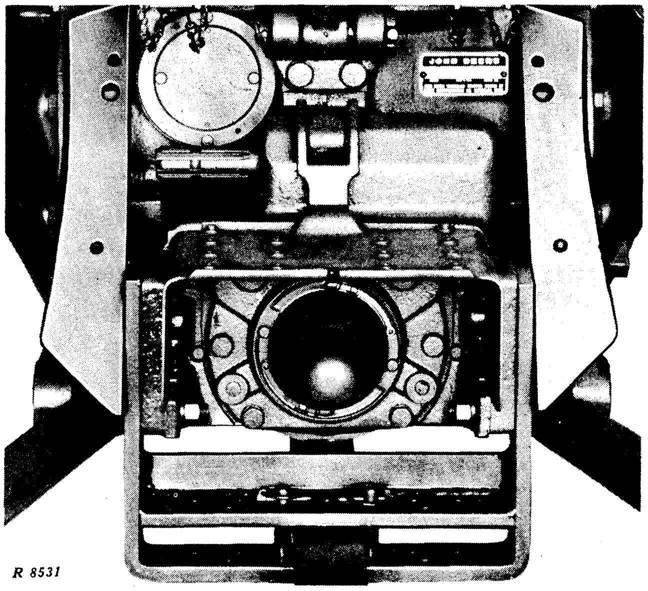
If a category 2 implement is to be attached, each sway block is installed with the narrow flat edge facing the drawbar support.

The sway blocks can be installed in two positions for each implement category. When they are installed downward, along the sides of the drawbar support, they will eliminate implement side sway, whether the implement is in working position or in transport position. For some implements it will be necessary to install sway block shims, available from your dealer, between the sway blocks and the tractor drawbar support. Use the shims when the sway blocks are in the down position only.



Sway Blocks Installed to Eliminate Side Sway

When the sway blocks are pivoted upward, they eliminate side sway when the implement is raised for transport but permit it to sway when the implement is working.



Sway Blocks in Upper Position To Permit Side Sway When Implement Is Working (Category 2 Implement)

ATTACHING IMPLEMENT TO 3-POINT HITCH

(1) Set the drawbar in the short, high position. See page 36. If necessary, lock it at the extreme left-hand side of the support.

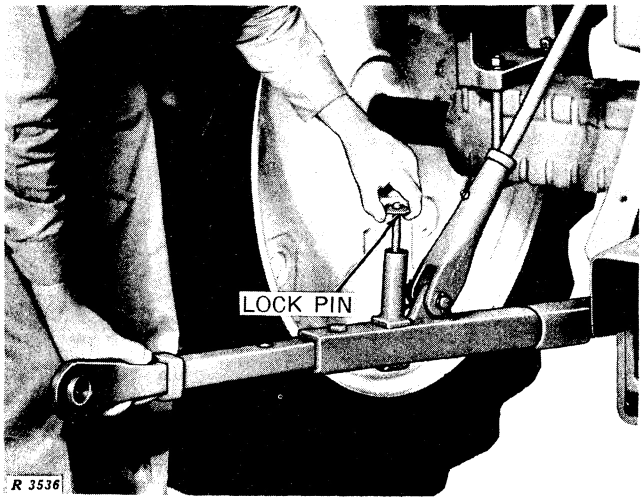
(2) The master shield may have to be removed to attach a short-coupled implement. See page 37.

(3) Make sure the selector lever is in the "D" (lower) position.

(4) Back up the tractor until the draft links of the 3-point hitch are approximately in line with the implement hitch pins. Place the speed selector or the shift lever in the "PARK" position. Raise or lower the draft links by means of the rockshaft control lever, if necessary.

Attaching Draft Links

(5) Pull up on the lock pins on the draft links and extend the telescoping draft links rearward.



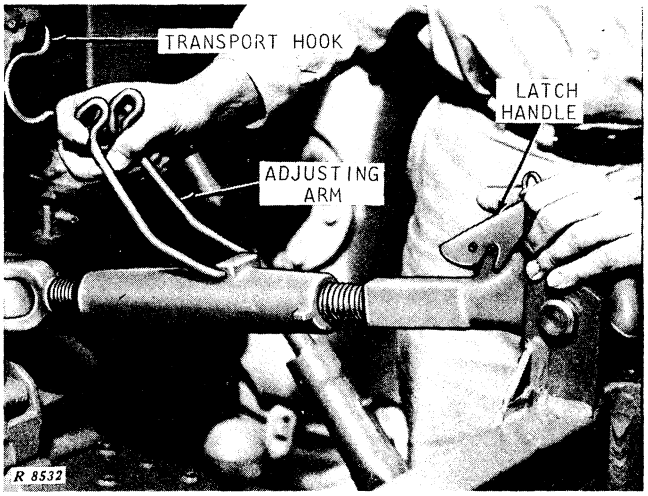
Extending Draft Link Rearward

(6) Raise the draft link ends by hand and slip the swivel ball sockets over the hitch pins. Lock them in place with the "Quik-Lock" pins provided. When not in use, store each "Quik-Lock" pin in the large hole in the pins which fasten the lift links to the draft links.

(7) Lock the telescoping draft links in operating position by backing up the tractor and raising and lowering the hitch. Be sure that the lock pins snap into place. For satisfactory hitch operation, the draft links must not bind on the sway blocks.

Attaching Center Link

(8) Remove the center link from the transport hook. Lift up on the chain on the center link latch handle and drop the center link hook onto the implement mast ball. To do so, it may be necessary to adjust the length of the center link.



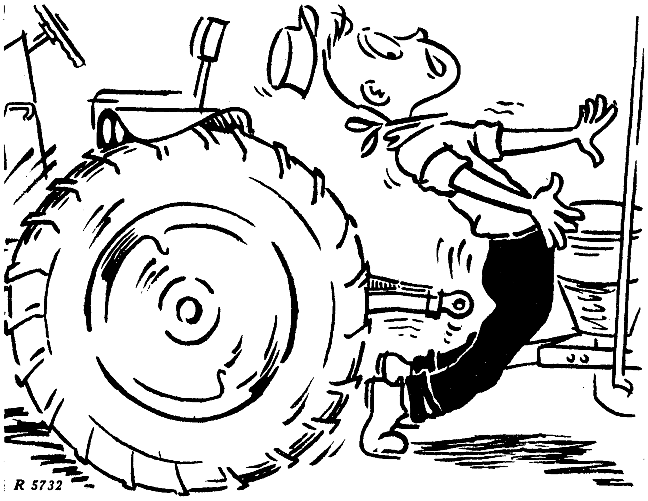
Adjusting Center Link

To adjust the center link, pull up the adjusting arm and, with the arm at right angles with the body, rotate the arm to lengthen or shorten the center link. Nominal length of the center link is 26-1/4 inches. After the center link is at the proper length, push the arm down to lock it in place.

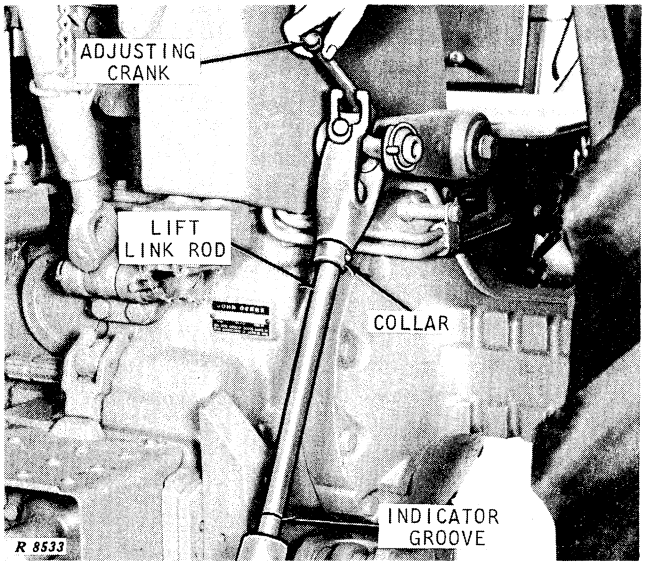
(9) Lock the hook to the mast ball firmly by releasing the chain on the latch handle.

(10) Raise the implement slowly and check for any points of interference. Make adjustments, if necessary.

(11) Move the selector lever to the desired position.



CAUTION: Do not stand between the tractor and implement unless the shift lever or the speed selector is in "PARK" position to hold the tractor stationary.



Adjusting Right-Hand Lift Link

ADJUSTING LIFT LINKS

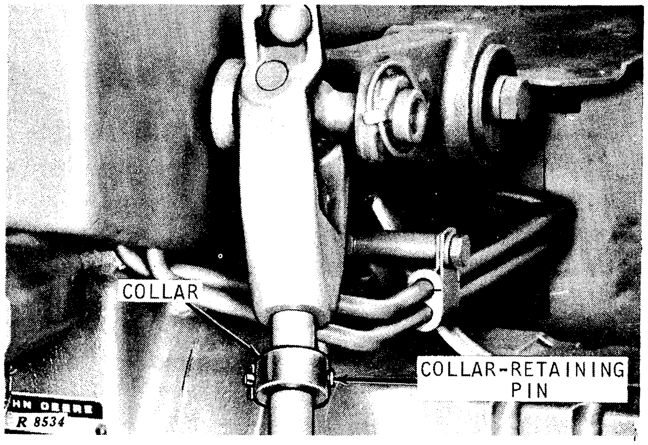
When the indicator groove is 1-1/4 inches above the lift link body, the lift link is at its nominal length (29-3/4 inches for row-crop tractors or 28-1/4 inches for standard tractors). The range of lift link adjustment is 1-1/4 inches shorter or longer than the nominal length.

NOTE: To prevent damage, do not shorten lift links enough to cause indicator groove to contact oil seal.

To adjust the right-hand or left-hand lift link, raise the adjusting crank above the lock and turn the crank clockwise to shorten the link or counterclockwise to lengthen it. To lock the adjustment, drop the crank to the rear into the lock that prevents the crank from turning.

ADJUSTING FOR LATERAL FLOAT

The collars at the top of the lift links may be lowered to permit lateral float of implements equipped with gauge wheels. Lowering the collars permits one side of the implement to follow ground contours without affecting the other side.



Lift Link Collar in Position for Lateral Float

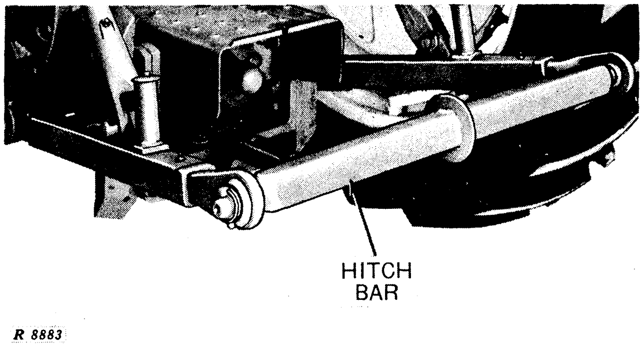
To lower the collars, remove the collar-retaining pins, slide the collars down 1 inch to second hole on the lift link rods, and replace the pins. Move both collars to the upper hole in the lift link rods for normal operation.

LEVELING THE IMPLEMENT

To level the implement LATERALLY (from side-to-side), it may be necessary to adjust the length of the right-hand lift link by means of its adjusting crank. After making the adjustment, make sure the adjusting crank is locked in place.

To level the implement FORE-AND-AFT, it may be necessary to adjust the length of the center link by means of the adjusting arm. After the implement is leveled, lock the adjusting arm in place. See the implement operator's manual for the recommended adjustments.

ATTACHING IMPLEMENT TO SQUARE HITCH BAR



Hitch Bar Installed on 3-Point Hitch

The hitch bar is installed between the draft links. With the square hitch bar in place, back the tractor to the implement. Line up the center of the hitch bar with the implement. With the hitch bar and implement hitch at the same height, back the tractor to engage the hitch bar with the implement. Hook the center link to the implement.

Lift the implement and lock the hitch bar to the implement. Raise the implement slowly and check for points of interference. Make adjustments if necessary.

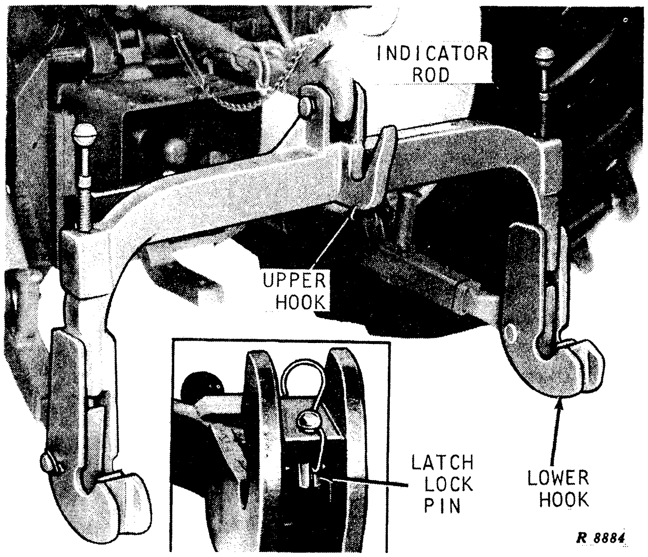
NOTE: Do not attach a towed load to the hitch bar. A drawn implement should be hitched to the drawbar assembly only.

QUIK-COUPLER

The Quik-Coupler provides a fast, easy means for attaching an integral category 2 implement to the Universal 3-Point Hitch without getting off the tractor. The Quik-Coupler, adapters, and latch lock pins are available from your John Deere dealer.

Installing Quik-Coupler on 3-Point Hitch

With an implement mast ball installed on the Quik-Coupler, install the coupler on the 3-point hitch draft links and center link as shown.



Quik-Coupler

Attaching Implement to Quik-Coupler

Install the two adapters or special adapters which are used with the Quik-Coupler on the ends of the implement hitch pins, with the large part outward. Secure the adapters in place with the roll pins provided.

With the spring-loaded latches on the coupler in the upper position (up and toward the front), back the tractor to the implement until the upper hook is behind the mast pin and between the sides of the implement mast. Raise the rockshaft. As the implement is raised by the coupler, the spring-loaded latches lock the implement to the coupler.

CAUTION: When the spring-loaded latches are properly locked, the indicator rods will protrude through the slots in the coupler frame adjacent to the latch rods.

To prevent accidental disconnecting of semi-integral implements that have a rotary motion of the adapters in the lower hooks, install latch lock pins as shown in the illustration inset. When the lock pins are not in use they can be stored at the top of the coupler frame latches.

Removing Implement from Quik-Coupler

To remove the implement, raise it far enough to reach the spring-loaded latches. Push both latches downward and rearward to lock them in the disconnect position. Lower the implement to the ground.

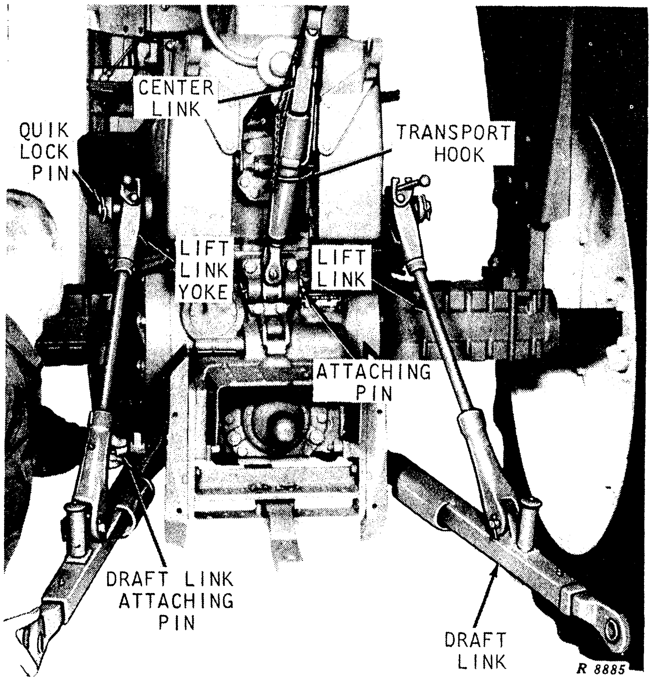
Continue lowering hitch and coupler until the coupler hooks clear the implement mast and hitch pin adapters. Drive the tractor forward away from the implement.

NOTE: Do not attach a towed load to the 3-point hitch and Quik-Coupler. A drawn implement should be hitched to the drawbar only.

REMOVING THE UNIVERSAL 3-POINT HITCH

The Universal 3-Point Hitch can be removed, when necessary, as follows:

Detach the front end of each draft link from the tractor by removing the "Quik-Lock" pins and pulling out the draft link attaching pins.

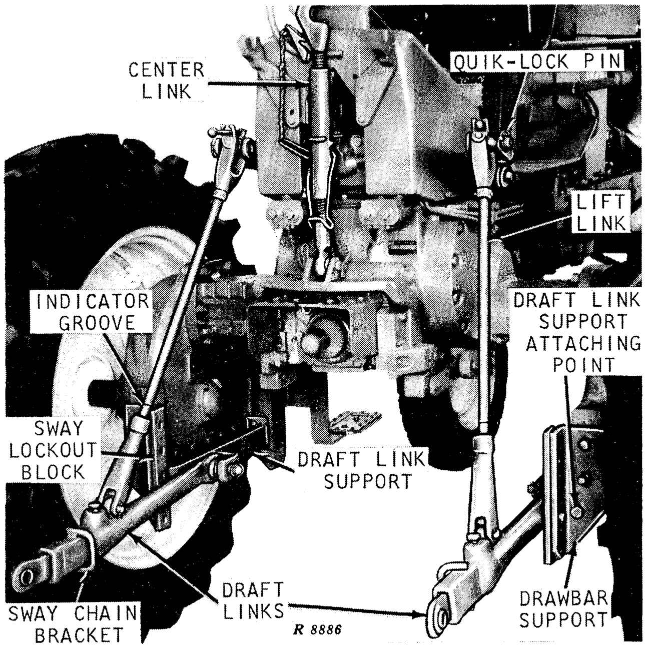


Removing 3-Point Hitch

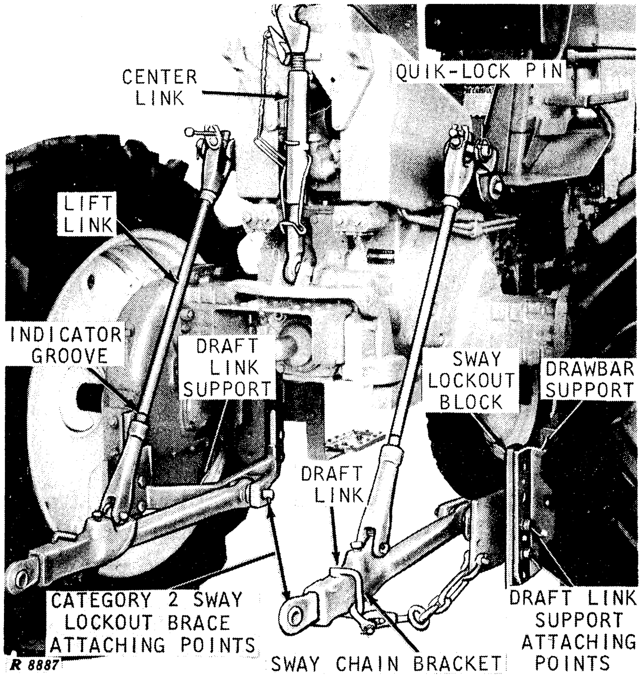
Detach the top end of each lift link from the rockshaft arms by removing the "Quik-Lock" pins and bushings from the outside boss of the rockshaft lift arms. Then force each lift link yoke to the outside. This permits the draft links and lift links to be removed.

Detach the center link from the tractor by removing the "Quik-Lock" pin and pulling out the center link attaching pin. Then pull the center link out of the transport hook to remove the center link from the tractor.

HI-CROP 3-POINT HITCH


CENTER LINK
QUIK-LOCK PIN
LIFT LINK
INDICATOR GROOVE
DRAFT LINK SUPPORT ATTACHING POINT
SWAY LOCKOUT BLOCK
DRAFT LINK SUPPORT
DRAFT LINKS
DRAWBAR SUPPORT
SWAY CHAIN BRACKET
R 8886

Hi-Crop 3-Point Hitch for Wide Clearance Implement


CENTER LINK
QUIK-LOCK PIN
LIFT LINK
INDICATOR GROOVE
DRAFT LINK SUPPORT
SWAY LOCKOUT BLOCK
DRAWBAR SUPPORT
DRAFT LINK
CATEGORY 2 SWAY LOCKOUT BRACE ATTACHING POINTS
SWAY CHAIN BRACKET
DRAFT LINK SUPPORT ATTACHING POINTS
R 8887

Hi-Crop 3-Point Hitch for Modified Category 1 or Category 2 Implement

The Hi-Crop 3-point hitch provides a fast, easy means of attaching integral implements such as cane tool implements, tool carriers, and modified category 1 and category 2 implements with 29 or 30 inch mast.

INSTALLING 3-POINT HITCH

If the drawbar frame is installed, remove it. Support the heavy drawbar frame when removing the four attaching bolts. Leave the sway lockout blocks installed on the drawbar supports.

If a wide clearance implement is to be used, install the wide clearance implement draft link supports between the front and rear drawbar supports. Attach the draft links to the draft link supports with the sway chain brackets to the inside as shown in the left-hand illustration.

If a modified category 1 or 2 implement is to be used, install the category 1 or 2 draft link supports in the second and third holes up in the drawbar supports. Install the draft links with the sway chain brackets to the outside. Connect the sway chains to the draft links and to the lower holes in the draft link supports as shown in the right-hand illustration.

Attach the upper ends of the lift links to the rockshaft lift arms with the adjusting handles to the rear. Attach the center link to the tractor.

ATTACHING IMPLEMENTS TO 3-POINT HITCH

When attaching implements to the Hi-Crop 3-point hitch, use the following instructions and most of the instructions given on pages 26 through 29.

The PTO master shield may have to be removed. See the implement operator's manual.

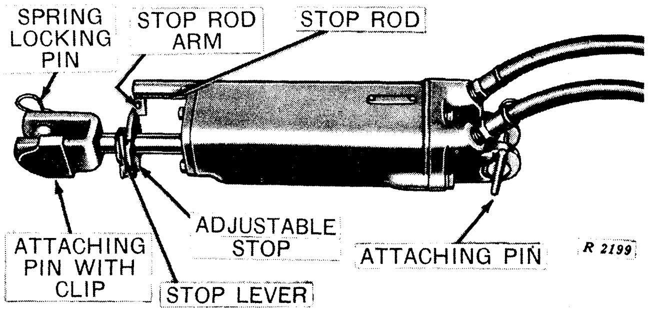
Attach the draft link and center link to the implement. To attach wide clearance implements, the sway lockout blocks may have to be removed.

After the implement is attached, slowly raise it to transport position and check for interference. On category 1 and 2 implements, adjust the sway chain length to permit only a slight amount of sway when raised.

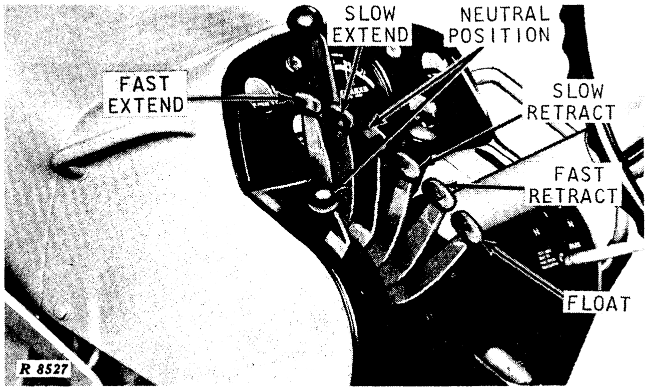
To eliminate all side sway on category 2 implements, install the sway lockout brace between the right-hand implement hitch pin and the left-hand draft link attaching pin. Install lockout brace on implement hitch pin first then install the draft link.

Adjust the lift links and the center link. Hi-Crop lift link length is 41-3/16 inches with the indicator groove 1-1/4 inches above the lift link body.

REMOTE HYDRAULIC CYLINDERS



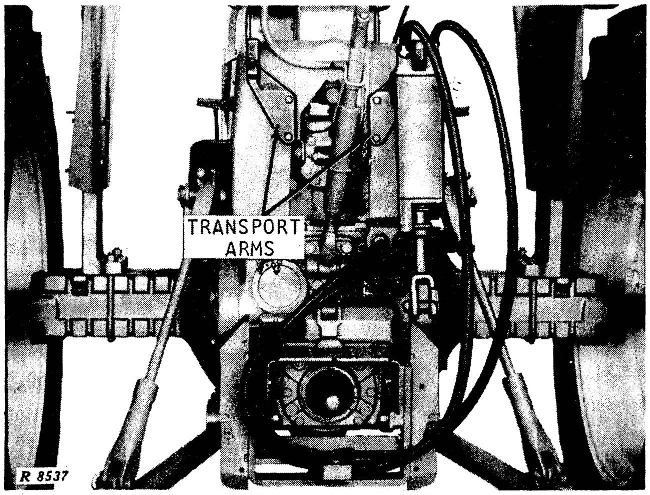
Remote Hydraulic Cylinder



Remote Cylinder Operating Levers

Your tractor may be equipped to operate one or two single-acting or double-acting remote hydraulic cylinders. The cylinders are connected by hoses to breakaway couplers at the rear of the tractor and are operated by oil from the main hydraulic pump. Pressure oil from the pump is directed by the selective control valves, located under the hood, to the breakaway couplers. The two remote cylinders may be operated individually or simultaneously.

When not in use, the remote cylinders can be stored on the transport arms at the rear of the tractor.



Remote Cylinder on Transport Arm

USING REMOTE CYLINDER OPERATING LEVERS

Tractors equipped to operate one remote hydraulic cylinder have a remote cylinder operating lever located outside of the rockshaft control lever. Tractors equipped to operate two remote cylinders have two remote cylinder operating levers side by side. The inner lever operates the remote cylinder attached to the right-hand breakaway coupler, and the outer lever operates the cylinder attached to the left-hand breakaway coupler. Each lever has six operating positions:

(1) Neutral. Move lever to center position in the quadrant.

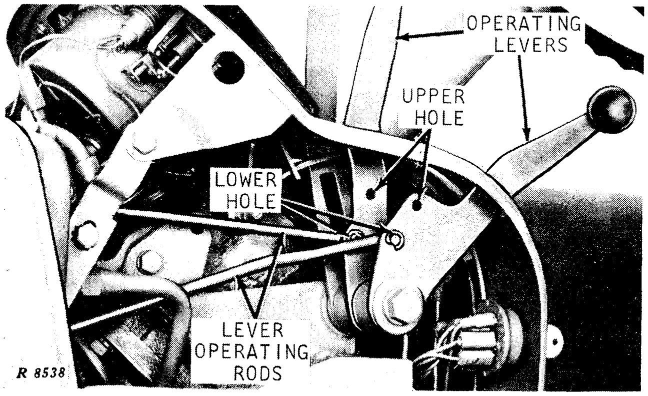
(2) Slow Extend. Move lever slightly forward from neutral. The lever must be held until the desired adjustment is reached. In most applications, this will raise the implement.

(3) Fast Extend. Move lever all the way to the front. The lever will remain in this position until the end of the piston stroke when it will automatically return to the neutral position.

(4) Slow Retract. Move lever slightly toward the rear from neutral. The lever must be held until the desired adjustment is reached. In most applications, this will lower the implement.

(5) Fast Retract. Move lever rearward to the first lock position. The lever will remain in this position until the end of the piston stroke when it will automatically return to the neutral position.

(6) Float. In addition, after making a simple adjustment, each lever may be moved all the way rearward in the quadrant to a float position to permit the implement to follow the ground contour. The lever will lock in the float position until pushed forward to a new position.

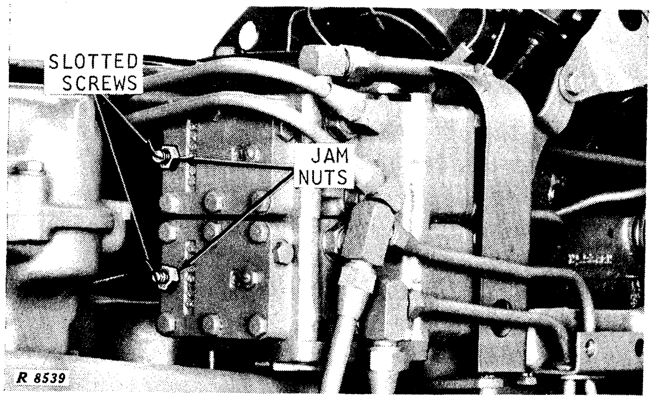


Lever Adjustments for Float Position

It is necessary to change the position of the lever operating rod before an operating lever can be moved to the float position. To do so remove the cowl (page 57). Then move the lever operating rod from the lower hole in the lever to the upper one and replace the cowl. The operating rod can be moved back to the lower hole when the float position is not desired.

ADJUSTING RATE OF OPERATION

The rate of operation of each remote hydraulic cylinder can be increased or decreased by adjusting the selective control valve. This adjustment increases or decreases the maximum flow of oil to the remote cylinders. The adjustment also affects the speed with which the implement will be raised.



Selective Control Valves

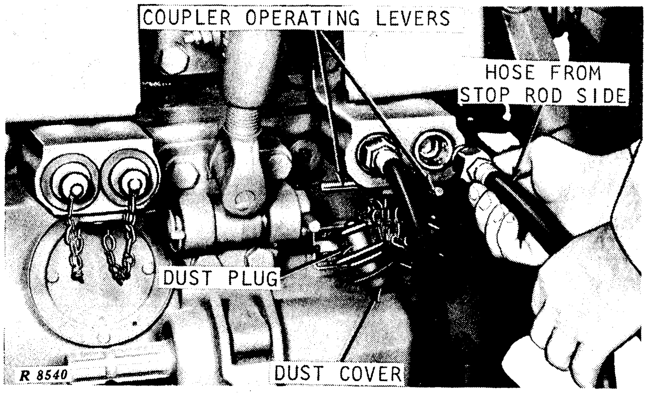
To make the adjustment, remove the left-hand side shield, reach up under the hood, loosen the jam nut, and turn the slotted screw on the selective control valve clockwise to decrease the rate of operating or counter-clockwise to increase it.

CAUTION: Full extension or retraction of a 3 x 8-inch remote cylinder should require at least 2 to 2-1/2 seconds. Faster speeds may cause damage.

The upper selective control valve operates the remote cylinder connected to the right-hand breakaway coupler. The lower valve operates the remote cylinder connected to the left-hand breakaway coupler.

CONNECTING HOSES TO BREAKAWAY COUPLERS

Breakaway couplers at the rear of the tractor are used to couple or uncouple remote cylinder hoses under pressure without loss of oil, regardless of whether or not the tractor engine is running. They also safeguard the hoses by permitting them to be pulled loose from the tractor without damage or loss of oil if a drawn implement should become disconnected from the tractor.



Connecting Remote Cylinder Hoses

Remove the dust plugs and store them on the spring clips under the breakaway coupler. Remove the dust covers from the hose ends and store them on the coupler dust plugs. Always be sure the hose ends and the coupler receptacles are free from dirt before connecting the hoses.

Insert the hose from the stop rod side of the cylinder into the right-hand receptacle of the coupler. After the hoses are properly attached, move the coupler operating levers until they are at a right angle to the hoses. This lifts the valves in the hose end and the receptacle off their seats and permits oil to flow.

When the remote cylinder operating lever is pushed forward, the implement will normally rise if the hoses are properly attached.

BLEEDING REMOTE CYLINDER

If the hoses have been disconnected from the remote hydraulic cylinder, or if a new cylinder or one that has been out of service is installed, all trapped air must be removed after the hoses are connected to the breakaway coupler. Place the cylinder on the transport arm with the hose end up. Start the engine and move the remote cylinder operating lever back and forth seven or eight times to bleed the air from the cylinder.

ATTACHING REMOTE CYLINDER TO IMPLEMENT

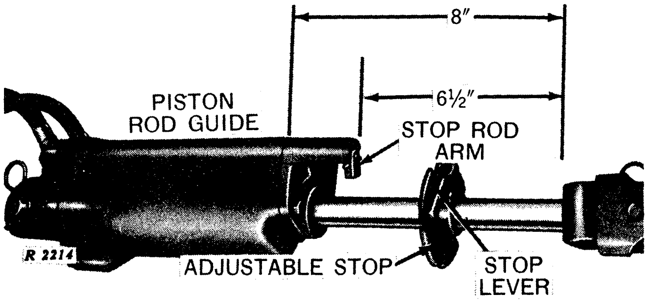
To install a remote hydraulic cylinder on most implements, remove the spring locking pins and pull the attaching pins.

Set the remote cylinder in place on the implement. Install the attaching pins and locking pins.

Many implements have a locking device to hold it in transport position when the remote cylinder is removed. Be sure to disengage the locking device before attempting to operate the remote cylinder. See your implement operator's manual.

ADJUSTING REMOTE CYLINDER STOP

The remote hydraulic cylinder is equipped with an adjustable stop so that its working stroke may be adjusted to the requirements of the implement.



Remote Cylinder Adjustable Stop Range

The total working stroke may be varied from 0 to 8 inches. Moving the adjustable stop varies the fast retract stroke from 0 to 6-1/2 inches. After the adjustable stop contacts the stop rod arm, 1-1/2 inches of slow travel may be gained by holding the remote cylinder operating lever in the slow retract position.

To adjust the piston stroke, lift the stop lever and slide the adjustable stop along the piston rod to the desired position. Press the stop lever down to clamp the stop securely on the rod. If the stop does not clamp securely, lift the stop lever and rotate it clockwise before locking it in place.

NOTE: Be sure that the adjustable stop is clamped securely on the piston rod to prevent possible damage and is positioned on the rod so that one of its flanges will contact the stop rod arm.

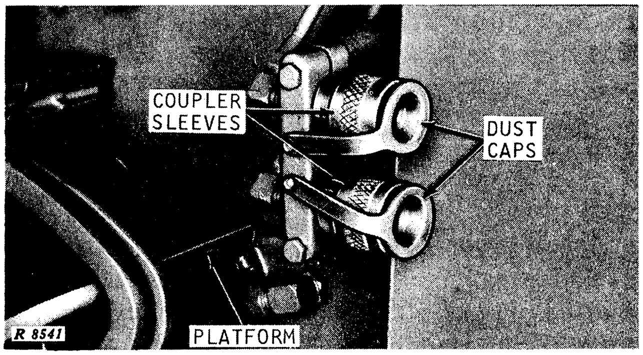
REMOVING HOSES FROM BREAKAWAY COUPLERS

To remove a remote cylinder hose from the breakaway coupler, pull the hose rearward from the coupler. The coupler lever will automatically move to the rearward position.

After the remote cylinder hoses are removed, insert the dust plugs in the receptacles and place the dust caps on the hose ends.

FRONT COUPLERS

Your tractor can be equipped with front couplers to connect the hoses from hydraulic cylinders on front-mounted implements. The front couplers are located ahead of the operator's platform on each side of the tractor.



Front Couplers

To connect remote cylinder hoses to the front couplers, stop the engine and move the remote cylinder operating levers back and forth several times to relieve the pressure on the couplers. Remove the coupler dust caps and clean all dirt from the couplers and the hose ends. Slide the coupler sleeve backward, insert the hose in the coupler, and allow the sleeve to slide forward and lock the hose to the coupler.

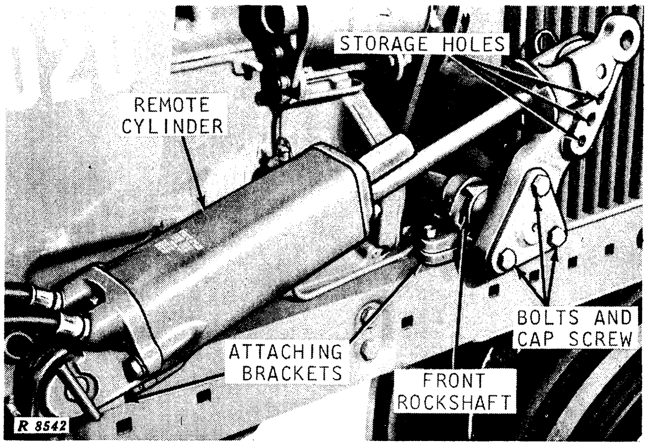
If it is difficult to insert the hoses, relieve the pressure in the remote cylinder by pressing the ball in the hose end against a clean flat surface.

The hose from the stop rod side of a double-acting cylinder is connected to the top coupler. Connect the hose from a single-acting cylinder to the top coupler.

If it is difficult to disconnect the hoses from the front couplers, relieve the pressure on the coupler by stopping the engine and moving the remote cylinder operating lever back and forth.

Do not connect remote cylinders to both the breakaway couplers and the front couplers so that they are operated by the same remote cylinder operating lever.

FRONT ROCKSHAFT

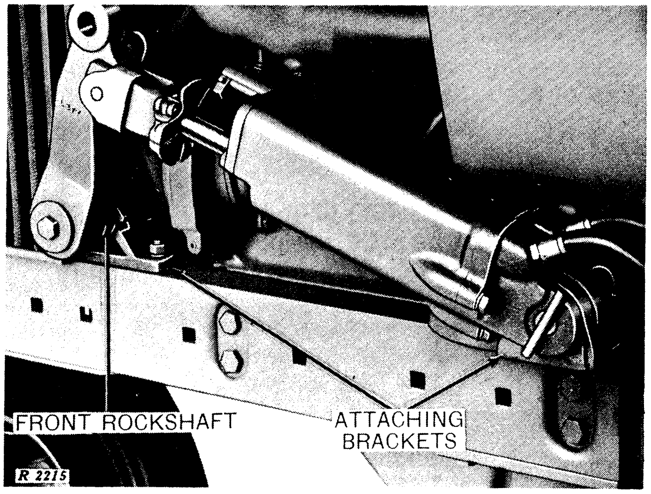


Front Rockshaft with One Remote Cylinder Mounted on Right-Hand Side

Your tractor may be equipped with a front rockshaft which permits raising and lowering of the front rigs of cultivators and similar equipment independent of the rear rigs which are controlled by the rear rockshaft. In addition, front rigs can be raised and lowered independently when two remote cylinders are mounted on the front rockshaft.

The double-acting remote cylinders which operate the front rockshaft are controlled by the remote cylinder operating levers.

After working depth of the front rigs has been established, the depth can be maintained by setting the adjustable stops on the double acting remote cylinders. Then, the front rigs will return to the preset depth after having been raised.



Rockshaft with Remote Cylinder Mounted on Left-Hand Side

SIMULTANEOUS LIFT ARM OPERATION
(One Cylinder)

One remote cylinder is used to raise or lower both of the lift arms simultaneously but independently of the rear rockshaft.

The remote cylinder is usually mounted on the right-hand side of the tractor. However, the cylinder can be mounted on the left-hand side by obtaining the necessary parts from your John Deere dealer.

Be sure the bolts and cap screws are installed in the right-hand end of the rockshaft as illustrated.

INDEPENDENT LIFT ARM OPERATION
(Two Cylinders)

Two remote cylinders are used to raise or lower the front rockshaft lift arms independently of each other. Remove the bolts and cap screw from the right-hand end of the rockshaft and store them in the three holes provided on the rockshaft arm. Install a cylinder on each side of the tractor. Connect both cylinders to the front rockshaft.

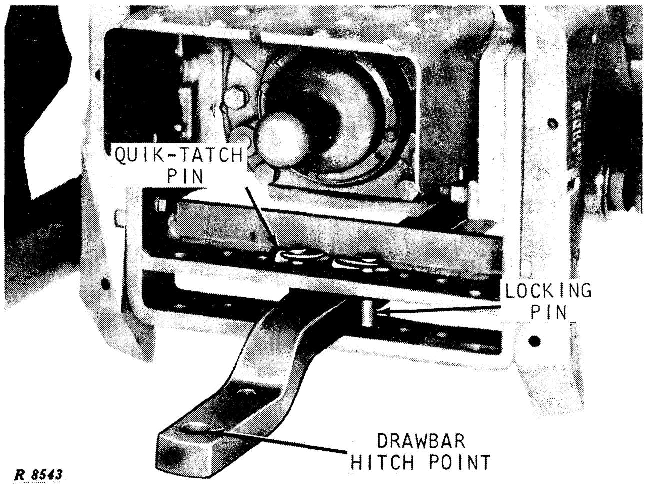
CAUTION: Remote cylinder will be damaged if the piston rod end is placed in top hole of the front rockshaft arm.

DRAWBAR ASSEMBLY

The drawbar assembly is used to hitch all drawn implements to the tractor. Use the drawbar to pull towed loads only. Attach integral equipment to the 3-point hitch or to the 3-point hitch with hitch bar or Quik-Coupler.

NOTE: Before attaching a load to the drawbar on row-crop or standard tractors, place the selector lever in the "D" (lower) position (page 26). Keep the lever in this position after the implement is attached.

The drawbar assembly adjustments and the adjustments on most drawn implements enable the operator to obtain a correct line of draft which is essential to obtaining a minimum amount of rear wheel slippage and the full amount of drawbar pull without raising the front wheels.

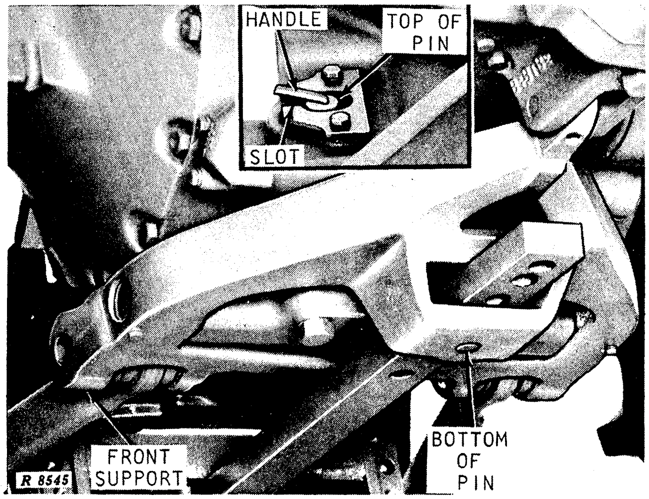

QUIK-TATCH PIN
LOCKING PIN
DRAWBAR HITCH POINT
R 8543

Offset Drawbar Installed in Short, Low Position

ROW-CROP AND STANDARD TRACTORS

To change horizontal drawbar adjustment, move the locking pins and "Quik-Tatch" pins to another hole in the crossbar.

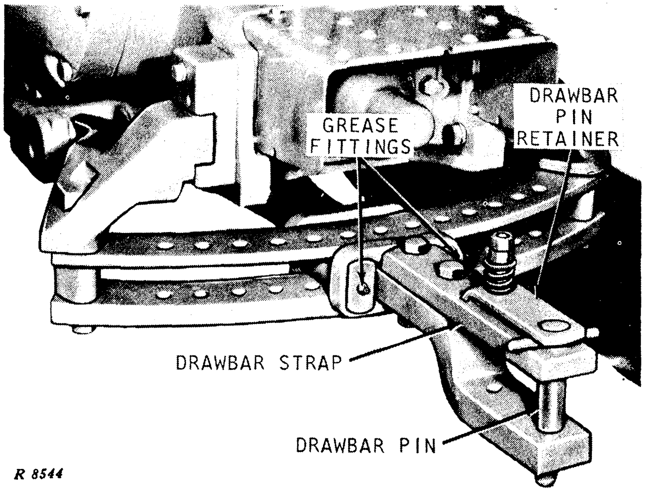
Vertical adjustment is made by turning the drawbar over. Make lengthwise adjustments by placing the drawbar pivot pin in another hole.


HANDLE
TOP OF PIN
SLOT
FRONT SUPPORT
BOTTOM OF PIN
R 8545

Drawbar Pivot Pin

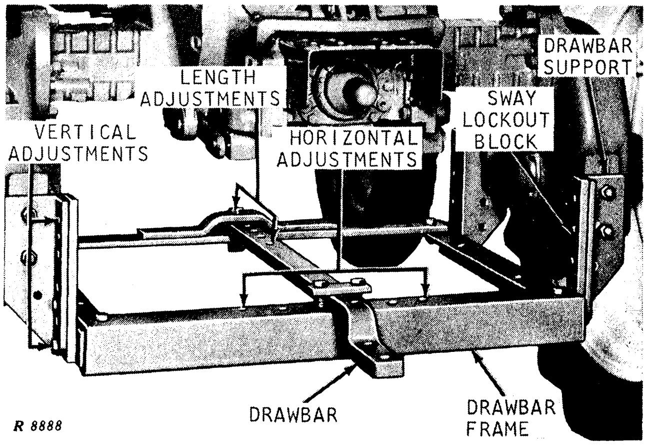
To remove the drawbar pivot pin, line up the pin handle with the slot on the front support. Lift up the pin and move the drawbar to the desired position. Drop the pin so the handle passes through slot in front support. Then turn the handle to lock the pin in position. To prevent injury, never put your finger in the drawbar pivot pin hole.

If your tractor is equipped with the special wide-swing drawbar assembly, a drawbar clevis consisting of a strap, drawbar pin, and pin retainer is furnished as regular equipment. These parts are used when the towed implement does not have a clevis. The strap is bolted to the drawbar. When the drawbar offset is up, the pin retainer is bolted on top of the drawbar. When the drawbar offset is down, the pin retainer is bolted on top of the strap.


DRAWBAR PIN RETAINER
GREASE FITTINGS
DRAWBAR STRAP
DRAWBAR PIN
R 8544

Wide-Swing Drawbar Assembly with Clevis

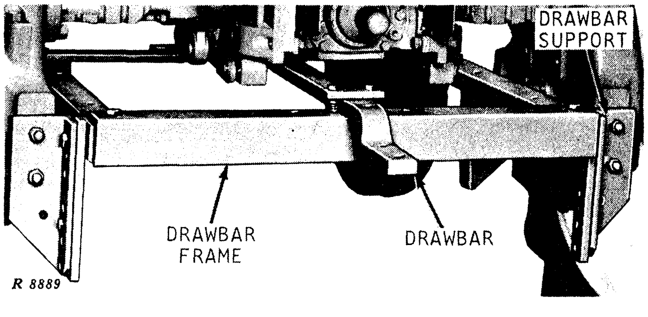
HI-CROP TRACTORS


LENGTH ADJUSTMENTS
DRAWBAR SUPPORT
VERTICAL ADJUSTMENTS
HORIZONTAL ADJUSTMENTS
SWAY LOCKOUT BLOCK
DRAWBAR
DRAWBAR FRAME
R 8888

Hi-Crop Drawbar Frame in Low Position

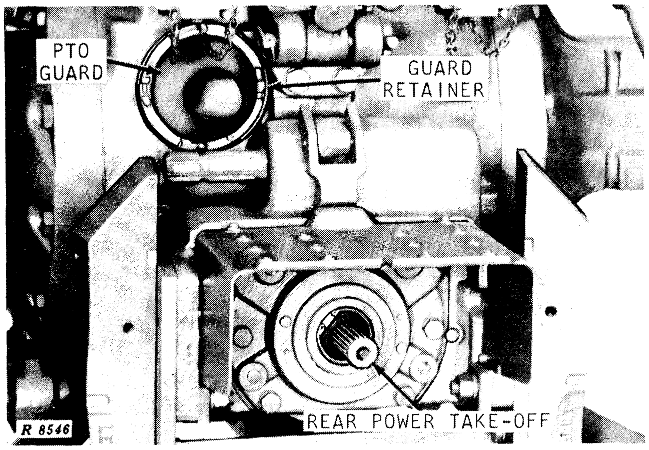
The Hi-Crop tractor drawbar may be adjusted vertically, horizontally, or lengthwise by bolting the drawbar or drawbar frame in the desired position.

CAUTION: For heavy drawbar work, the drawbar frame must be in the low position. Intermediate and high positions are for light loads only.


DRAWBAR SUPPORT
DRAWBAR FRAME
DRAWBAR
R 8889

Hi-Crop Drawbar Frame in High Position

POWER TAKE-OFF

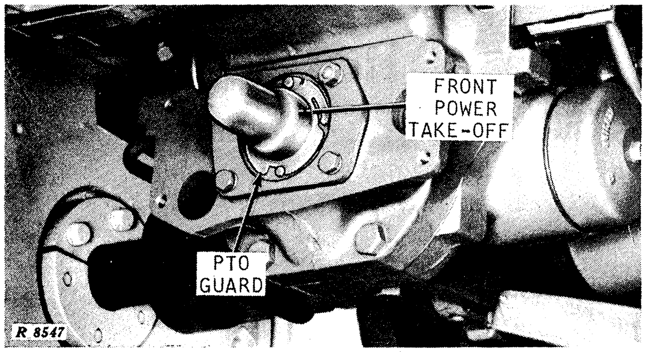

PTO GUARD
GUARD RETAINER
REAR POWER TAKE-OFF
R 8546

Rear Power Take-Off with Guard Removed

Your tractor may be equipped with a power take-off to drive PTO-driven machines. The PTO shaft supplies continous power as long as the engine is running and the PTO clutch lever is engaged.

The front power take-off, located at the center of the tractor, has a 21-tooth spline for work with the 1000-rpm PTO machines.

The rear power take-off may be 1000-rpm only or dual speed, 540-1000-rpm. A 6-spline stub shaft is installed on the rear dual speed PTO for 540-rpm operation. A 21-spline stub shaft converts the rear dual speed PTO to 1000-rpm.


FRONT POWER TAKE-OFF
PTO GUARD
R 8547

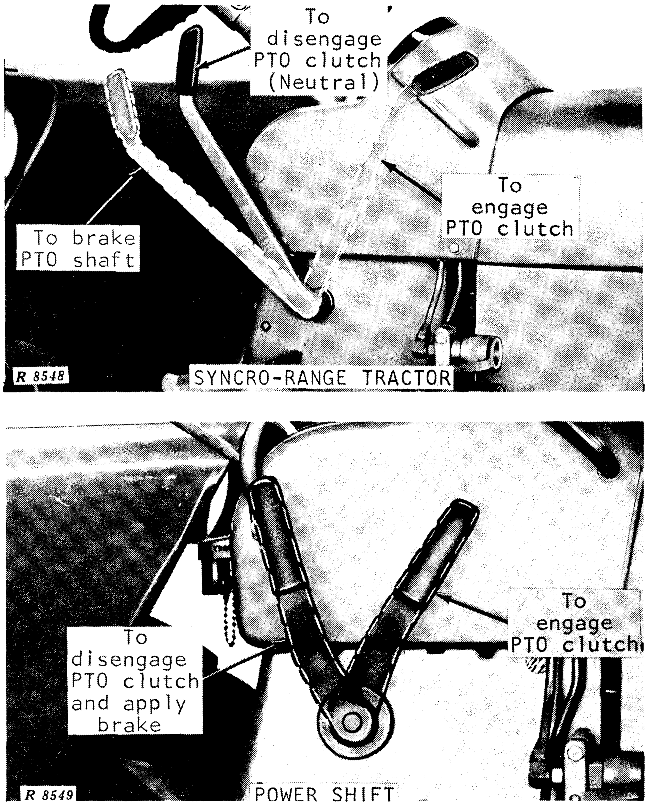
Front Power Take-Off with Guard Installed

USING PTO CLUTCH LEVER

The power take-off shaft is controlled by the PTO clutch lever. Pushing the lever all the way forward engages the PTO clutch to operate the PTO. Pulling the lever all the way back disengages the PTO clutch and engages the PTO brake.

On Syncro-Range tractors, moving the lever slightly forward from the brake position places the lever in the neutral position.

When the PTO is not in use, place the lever on Syncro-Range tractors in the NEUTRAL position. On Power Shift tractors, move the lever rearward to the disengaged or brake position.


To disengage PTO clutch (Neutral)
To engage PTO clutch
To brake PTO shaft
SYNCRO-RANGE TRACTOR
R 8548
To engage PTO clutch
To disengage PTO clutch and apply brake
POWER SHIFT
R 8549

PTO Clutch Lever Operating Positions

REMOVING PTO GUARD

Remove the front or rear PTO guard only when that particular end of the power take-off shaft is to be used.

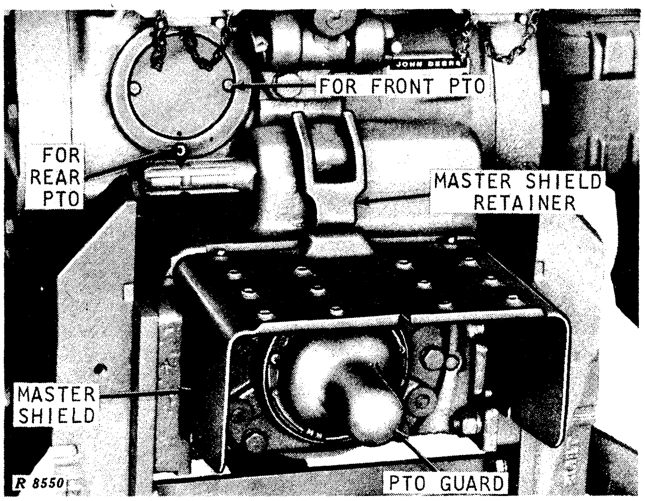
To remove either guard, twist it counterclockwise. The guard is stored by placing it on the guard retainer and twisting it clockwise to lock it in place. The front PTO guard is installed in the center of the guard retainer, and the rear PTO guard is installed on the outer ring of the guard retainer.

Always remove the guard from the guard retainer and install it on the power take-off when the PTO is not being used.

REMOVING MASTER SHIELD

When attaching an implement, it may be necessary to remove the master shield at the rear of the tractor. To do so, push forward on the lower end of the master shield retainer and lift the master shield from the tractor.

CAUTION: Remove the master shield only when necessary. Be sure that it is in place when the PTO guard is removed.



Master Shield and PTO Guard

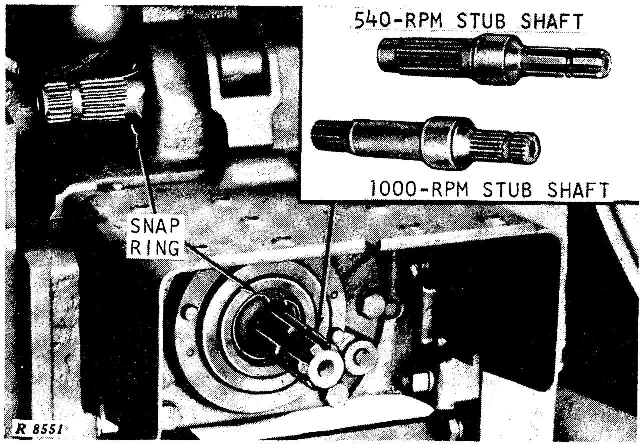
CONVERTING REAR PTO SPEED (Dual Speed Only)

To change 540-1000 rpm power take-off to a new speed, first clean the dirt from the stub shafts. Then remove the snap rings that retain both stub shafts. Pull the upper stub shaft from its storage hole in the transmission case.

Pull the stub shaft for the old speed from the rear power take-off and quickly install the stub shaft for the new speed to prevent loss of transmission oil. It may be necessary to rotate the collar, in which the snap ring is installed, to align the rear splines.

Place the old speed stub shaft in the storage hole in the transmission case to prevent loss of oil from the storage hole and to conveniently store the stub shaft so that the power take-off may be converted to the original speed. Install the snap rings.

CAUTION: Before installing the stub shafts, be sure they are free from dirt or foreign matter.



540 Rpm Stub Shaft on Rear Power Take-Off

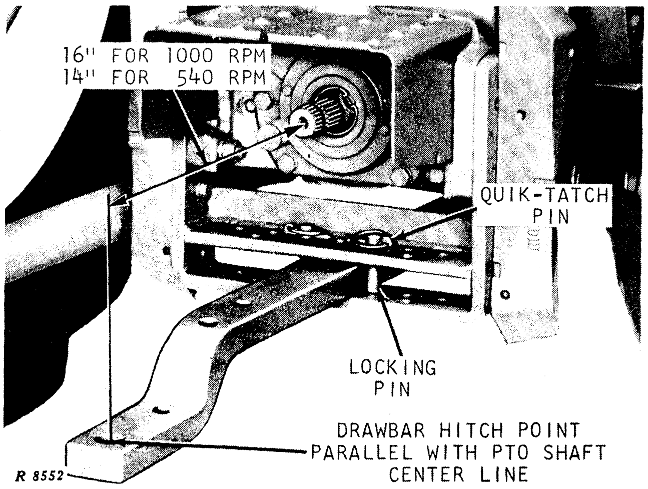
ATTACHING PTO-DRIVEN IMPLEMENT

When the rear power take-off is to be used, lock the drawbar parallel to the PTO shaft with the drawbar offset down. Position the locking pins as shown in the illustration.

If the rear power take-off is to be operated at 540 rpm, make lengthwise adjustment of the drawbar so that the hole in the drawbar end is 14 inches behind the end of the PTO shaft.

If the rear power take-off is to be operated at 1000 rpm, make lengthwise adjustment so that the hole in the end of the drawbar is 16 inches behind the end of the PTO shaft.

NOTE: The offset in the drawbar should always be downward for PTO work.



Drawbar Adjustment for PTO-Driven Implement

Possible damage to the universal joints on the drawn implement can be avoided if these simple adjustments are made before attaching the implement to the tractor.

With the engine stopped and the PTO clutch lever in the disengaged position, attach the PTO-driven implement and PTO shields to the tractor. Start the engine and place the hand throttle in the 2100 load speed position (page 9). Engage the PTO clutch by slowly pushing the operating lever as far forward as it will go, starting the implement gradually. To obtain 540 or 1000 PTO rpm, the speed-hour meter hand should be at the PTO mark when operating the implement under load. See the implement operator's manual when the implement is designed to operate at other PTO speeds.

CAUTION: Always make sure the tractor engine is stopped and the PTO clutch disengaged before attempting to clean out a PTO-driven machine or to adjust the implement hitch, or power take-off linkage.

BELT PULLEY

When the tractor is to be used to operate belt-driven equipment, a belt pulley which is driven by the power take-off shaft may be mounted at the rear of the tractor.

With the engine operating at 2100 rpm, the belt pulley will operate at 978 rpm and the belt will travel at a speed of 3074 feet per minute.

The belt pulley is operated by using the PTO clutch lever in the same manner that it is used in operating the power take-off. For instructions in operating the PTO clutch lever, see page 37.

INSTALLING BELT PULLEY

If the tractor is equipped with Universal 3-Point Hitch, remove the left-hand draft link and lift link (see page 30). Remove the master shield and rear PTO guard (page 37).

The 1000 rpm stub shaft must be installed on the rear PTO. If the 540 rpm stub shaft is mounted on the tractor, remove the shaft and install the 1000 rpm stub shaft (page 38).

Install the belt pulley directly on the splined PTO shaft. Four cap screws are used to attach the belt pulley to the tractor. Check the oil level (page 53) each time the belt pulley is installed.

USING BELT PULLEY

Proper alignment of the tractor and the belt-driven equipment is very important. The following steps are recommended whenever the belt pulley is to be used.

(1) Place the belt on the pulley of the driven equipment.

(2) Stretch the belt to its full length, as straight as possible from the pulley of the driven equipment.

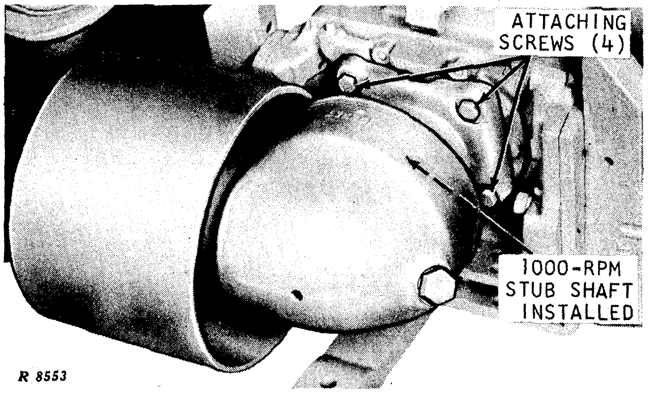
(3) Back the tractor toward the driven equipment, with the tractor straddling the belt.

(4) Drive the tractor forward, watching to see that the belt is being aligned with the pulley on the tractor.

(5) Slip the belt over the pulley on the tractor and drive forward until the belt is tight. Engage the PTO clutch slowly, watching the belt to see that alignment is correct.

(6) If alignment is not perfect, back the tractor slightly and then drive forward, steering in the direction necessary to obtain correct alignment.

(7) Move the shift lever or speed selector to "park" position to hold the tractor stationary.



Belt Pulley Installed on Tractor

CAUTION: Always start a belt load slowly. Never leave the tractor running unattended when making adjustments on the tractor or driven machine, even though the PTO clutch may be disengaged. Never use a stick to force a belt on or off a revolving pulley.

To remove the belt, disengage the PTO clutch lever and back up the tractor to provide the necessary slack. Then slip the belt from the pulley on the tractor and from the pulley on the driven equipment.

GROUNDING THE TRACTOR

Under some conditions, static electricity will be generated by the revolving belt. Since the tractor is insulated from the ground by its rubber tires, this electricity will be stored in the tractor until the operator touches it or until the charge is dissipated into the ground by some other means. While the shock received is not dangerous, the sparks produced during discharge create a fire hazard. To prevent a shock or spark, hang a chain from the drawbar, allowing it to contact the ground.

FINDING SIZE OF DRIVEN PULLEY

The following chart will help to determine the size of driven pulley to use to obtain a desired rpm from the driven equipment pulley.

Desired Rpm of Driven Pulley	Diameter of Driven Pulley to Use
600	19-1/2 inches
800	14-3/4 inches
1000	11-3/4 inches
1400	8-1/2 inches
1800	6-1/2 inches
2200	5-1/2 inches
2600	4-1/2 inches
3000	4 inches

SAFETY RULES

The safety of the operator is always a prime consideration in designing and developing a new tractor. Power take-off guards, shields, and other safety features are built into the tractor whenever possible. However, investigation of thousands of accidents shows that careless use of machinery causes a high percentage of accidents. You can avoid many accidents by observing the rules for safety given below. Study these rules carefully and insist that they be followed by those working with you and for you.

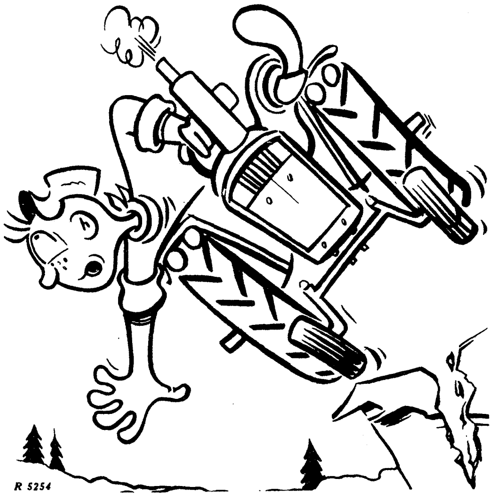
All power equipment should be operated only by those who are responsible and delegated to do so.

Provide a first-aid kit for use in case of accident. Use the proper antiseptics on scratches, cuts, and other injuries without delay to prevent the possibility of blood poisoning.

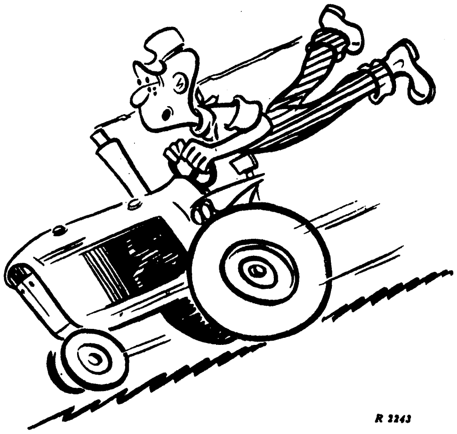
When transporting (or driving) the tractor on a road or highway at night or during the day, use accessory lights and devices for adequate warning to the operators of other vehicles. In this regard, check local governmental regulations. Various safety lights and devices are available at your John Deere dealer's.

Keep a firm grip on the steering wheel at all times when speed is increased.

Reduce speed before turning or applying brakes. Couple the brake pedals together (page 16) when traveling at high speeds. Be sure that both wheels are braked simultaneously when making an emergency stop. Drive at speeds slow enough to insure your safety, especially over rough ground.



Do not drive near the edge of a ditch or gully.



Always keep the tractor in gear when going down steep hills or grades.

The rate of tractor travel on hillsides and curves should always be such that there is no danger from tipping.

Be careful to prevent the tractor from tipping sideways if it strikes a hole, ditch, or other irregularity, especially when operating on hillsides.

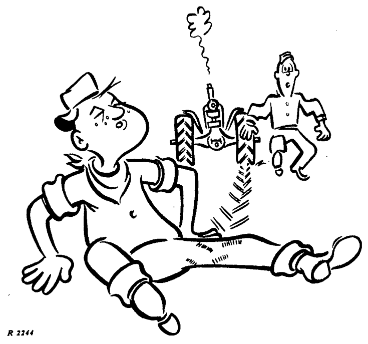
When driving out of a ditch, gully, or up a steep hillside, engage the clutch slowly. Be prepared to disengage the clutch promptly should the front wheels rise off the ground. Observe the same precautions if the rear wheels become mired in soft ground or drop in a hole. Back the tractor out of these situations.

Never operate the tractor engine in a closed garage or shed.

Always disconnect the battery cables before making adjustments on the electrical system or the engine. This prevents dangerous sparks which create a fire hazard and may cause harm or damage. This also prevents accidental starter operation.

When the tractor is hitched to a heavy load, always hitch to the drawbar and be sure to take up the slack in a chain slowly.

Do not oil, grease, or adjust the tractor while it is in motion.



Only one person—the operator—should be permitted on the tractor when it is in operation. Never allow a person to ride on drawbar or hitch.

Add coolant to the radiator only when the engine is stopped or slowly idling. To avoid being scalded when the pressure-type filler cap is being removed, turn the cap slightly to the stop to relieve pressure before removing the cap.

Whenever the tractor is stopped, place the shift lever or the speed selector in "PARK."

Do not leave the engine running while the tractor or drawn equipment is being adjusted or repaired unless specifically recommended.

Do not leave an implement in the raised position when it is not in use. Always lower it to the ground.

When hitching drawn equipment to the drawbar, back the tractor past the clevis. Then move forward so that, in making the connection, the tractor will be moving away from the equipment.

Use precaution in handling any type of tractor fuel. Never refuel the tractor when the engine is hot or running. Do not smoke while filling the fuel tank or servicing the fuel system.

It is a good practice to mount a fire extinguisher on the tractor. Be sure that the extinguisher is properly maintained and be familiar with its proper use.

Escaping hydraulic oil under pressure can cause personal injury; therefore, be sure all connections are tight and that lines, pipes, and hoses are not damaged. Before disconnecting lines or pipes in the tractor hydraulic system, be sure to relieve all hydraulic pressure.

Since loose clothing might catch in moving parts, always keep sleeves, jackets, or other clothing relatively tight and belted.

If your tractor burns LP-Gas, the safety rules which follow will help you avoid accidents involving this fuel. Although LP-Gas is not unduly hazardous, it must be handled carefully. Its characteristics are somewhat different than those of gasoline or diesel fuels and it requires different methods of handling if accidents are to be avoided.

All transfer of LP-Gas from one tank to another MUST be done outdoors in open country, away from any buildings.

Never leave the LP-Gas fixed-tube liquid-level gauge open to let vapor escape while liquid is being pumped into the tractor fuel tank.

Never fill an LP-Gas tractor fuel tank more than 80% full.

Always close both LP-Gas vapor and liquid withdrawal valves to stop the engine. Leave the valves closed until the engine is to be started again.

Remember that LP-Gas is always under pressure—it wants to get out of the tank and fuel system. Valves, fittings, and lines must be leakproof at all times and must never be loosened or removed without first taking steps to reduce the pressure.

Since LP-Gas is heavier than air it will sink to low spots if it escapes. No area in the vicinty of leaking LP-Gas is safe until the leak is stopped and the area is thoroughly ventilated.

Never store an LP-Gas tractor indoors unless the building is thoroughly ventilated.

Never enter a building in which an LP-Gas tractor is stored without first ventilating the building sufficiently to assure a complete change of air.

If an LP-Gas tractor must be taken indoors to be worked on during cold weather, make sure the tank and fuel system are empty and thoroughly purged of all gas.

Before removing the fuel strainer drain plug or carburetor sump drain plug from an LP-Gas tractor, be sure that both vapor and liquid withdrawal valves are closed, ignition switch is turned off, and engine is cold.

FUELS AND LUBRICANTS

Fuels

The quality of fuel used is a dominating factor in obtaining satisfactory engine life. Suitable fuels must be clean, completely distilled, well-refined, and non-corrosive to fuel system parts. Be sure to use fuel of known quality.

DIESEL FUEL SPECIFICATIONS

Either Grade No. 1-D or Grade No. 2-D fuel, as defined by ASTM designation D 975-60T for diesel fuel oils, may be used in a diesel tractor. The Grade No. 2-D fuel, which is heavier and will produce more work per gallon, is generally recommended for service when the prevailing air temperature is 32° F. or higher. The Grade No. 1-D fuel is generally recommended when the air temperature is less than 32° F. When other than normal engine service is encountered, use the following chart to select fuel:

FUEL SELECTION CHART

Type of Engine Service	Ambient Air Temperature	Diesel Fuel Grade No.
Wide variation in load and speed, considerable idling.	Below 80° F. Above 80° F.	1-D 2-D
Intermediate load and speed, minimum idling.	Below 40° F. Above 40° F.	1-D 2-D
Heavy load and high speed, minimum idling.	Below 0° F. Above 0° F.	1-D 2-D

Insist on Grade No. 1-D or Grade No. 2-D diesel fuel with the following general specifications.

Flash Point—100° F. minimum.

Pour Point—For cold weather operation, the pour point should be 10° F. below the temperature at which the engine is to be operated.

Distillation Temperature—90 per cent recovered at 675° F. maximum.

Viscosity at 100°F. —Saybolt Universal 30.0 minimum, 45.0 maximum.

Cetane Number—40 minimum. Low atmospheric temperature, as well as high-altitude operation, may require use of a fuel with a higher cetane number.

Sulphur Content—As low as possible, preferably less than 0.5 per cent and in no case over 1.0 per cent.

Sediment and Water—0.10 per cent maximum.

GASOLINE FUEL SPECIFICATIONS

A gasoline tractor is designed to operate economically on regular grade gasoline as defined by ASTM Designation 439-60T. The gasoline should have a minimum octane number rating of 84 (Motor Method) or 90 (Research Method). The distillation range or volatility is adjusted by the petroleum producers for local climatic conditions and also for seasonal variations.

Avoid carrying over gasoline purchased in one season for another season's work. For example, gasoline furnished for summer use is less volatile than that sold in the winter season and attempts to use the summer gasoline in cold weather can result in poor starting of the engine.

LP-GAS FUEL SPECIFICATIONS

The LP-Gas tractor is designed to use a butane-propane mixture composed of a maximum of 80% butane. In hot weather, a greater percentage of butane can result in excessive detonation under heavy loads due to the lower octane rating. Also, difficult starting may be encountered in cold weather due to lack of fuel pressure.

Many fuel companies furnish fuels of different composition for winter or summer use. These fuels are properly blended to give best performance during the prevailing season. Consult your fuel dealer before having your storage tank filled.

STORING FUEL

The importance of proper fuel storage cannot be stressed too highly.

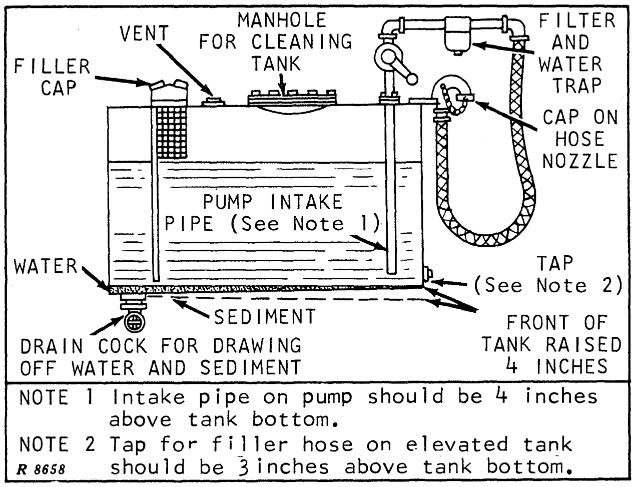
Many engine difficulties can be traced to dirty fuel. To keep the fuel system in its most efficient condition, keep all dirt, scale, water, and other foreign matter out of the fuel.

Fuel should be stored in a convenient place outside of buildings.

DIESEL AND GASOLINE FUEL STORAGE

NOTE: Prolonged storage of diesel fuels can cause gum formation and clog fuel filters.

A good fuel storage tank, such as the one illustrated, might be purchased or rented from a fuel company. It is recommended that a device be installed on the tank outlet to trap or filter out all water, dirt, or other contaminants. A dirty or deteriorated hose below the filter will contaminate the fuel.


VENT
MANHOLE FOR CLEANING TANK
FILTER AND WATER TRAP
FILLER CAP
CAP ON HOSE NOZZLE
PUMP INTAKE PIPE (See Note 1)
WATER
TAP (See Note 2)
SEDIMENT
FRONT OF TANK RAISED 4 INCHES
DRAIN COCK FOR DRAWING OFF WATER AND SEDIMENT
NOTE 1 Intake pipe on pump should be 4 inches above tank bottom.
NOTE 2 Tap for filler hose on elevated tank should be 3 inches above tank bottom.
R 8658

One Type of Fuel Storage Tank

If the tank has a hose, cap the nozzle so that dust and other contaminants cannot get in. If a container is used to transfer fuel to the tractor, keep the container clean. Be sure that the storage tank vent plug is screwed in tightly after withdrawing fuel.

Fuel storage in barrels is not recommended because they are often the source of contamination. However, when it is necessary, the following precautions will help to insure clean fuel.

Provide one clean barrel with a sump and drain cock and transfer the fuel to this barrel. Locate the barrel so that it will not have to be moved to remove fuel. Moving the barrel might stir up the water and dirt. If the barrel is placed on its side, elevate the spigot end so that water and dirt will not get out through the spigot. When the barrel is nearly empty, drain the remaining fuel into a container and allow it to settle before pouring off the clean fuel.

After refilling the storage tank or barrel, allow several hours for any foreign matter which might be present to settle before filling the tractor fuel tank.

LP-GAS FUEL STORAGE

The National Board of Fire Underwriters' Pamphlet No. 58 is the accepted guide for the safe handling and use of LP-Gas. Make sure that all LP-Gas storage facilities or equipment used in connection with your John Deere LP-Gas tractor complies with the specifications and regulations given in the pamphlet. This pamphlet can be obtained from the National Board of Fire Underwriters, 85 John St., New York 38, New York.

Fuel transfer equipment and instructions for handling LP-Gas may be obtained from your fuel dealer. He is informed on local and state regulations and can advise you on good safety practices.

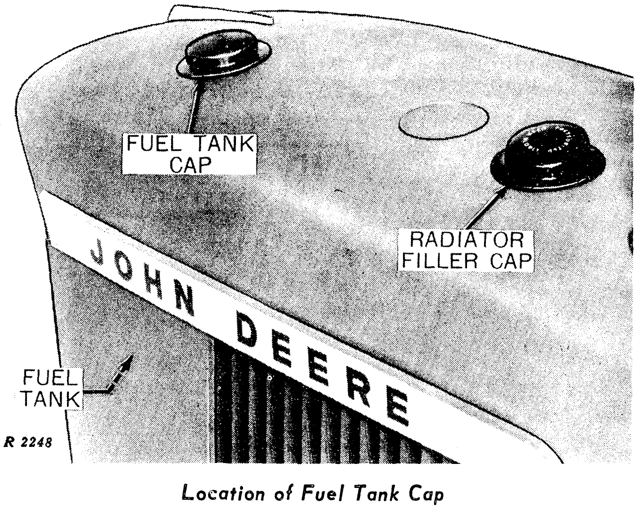
When handled carefully, LP-Gas is as safe as any other fuel. When handled carelessly, it is as dangerous as any other fuel. The use of COMMON SENSE, based on a knowledge of the fuel's characteristics and what can happen if it gets loose, will prevent accidents.

Both propane and butane are heavier than air and will settle in low quiet spots if they escape. This is one of the reasons it is so important to prevent leaks, and to ventilate low spots thoroughly, if escaped gas is detected, before any spark or flame is produced.

FILLING THE DIESEL OR GASOLINE FUEL TANK

The fuel tank on your tractor is located at the front under the hood in an enclosed, protected position. The fuel tank cap is located at the front left-hand side of the hood.

Fill the fuel tank at the end of each day's operation to prevent moisture from collecting and freezing in the fuel system. This will also assure an adequate fuel supply for the next day. Capacity of the fuel tank is 29 U.S. gallons.


FUEL TANK CAP
RADIATOR FILLER CAP
JOHN DEERE
FUEL TANK
R 2248

Location of Fuel Tank Cap

LP-GAS FUEL TANK

The LP-Gas fuel tank is of heavy welded steel construction with a fuel capacity of 33.6 gallons.

NOTE: The tank has a total volume of 42 gallons, but it must never be filled with more than 33.6 gallons, which is 80% of its total volume.

SAFETY RELIEF VALVE

The safety relief valve, at the top of the tank, opens to permit vapor to escape if the tank pressure rises above 312 pounds per square inch. If this valve opens frequently in hot weather, consult your fuel dealer for a different fuel blend.

FILLER VALVE

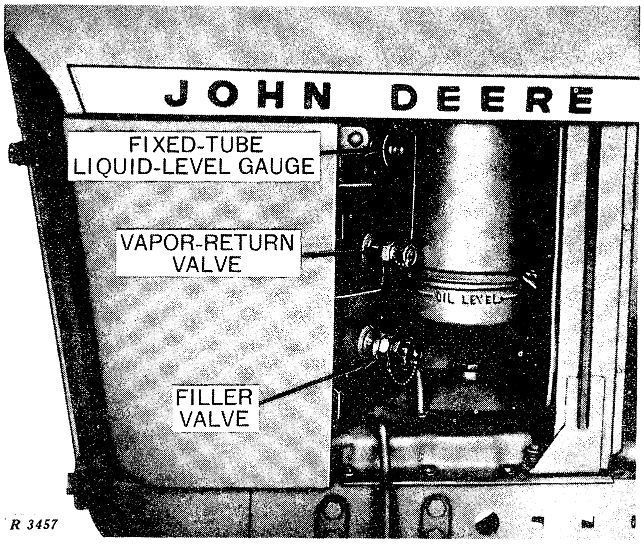
The filler valve, located on the side of the fuel tank, is used for filling the tank. A double check valve, built into the filler valve, automatically prevents any fuel withdrawal or escape.

VAPOR-RETURN VALVE

The vapor-return valve, located above the filler valve, is used to return vapor from the tractor fuel tank to the storage tank. This equalizes the pressures between the tanks and permits easier filling. A built-in excess-flow valve automatically closes if flow through the valve becomes excessive. This safety device restricts the flow of vapor if the return line is broken.

FIXED-TUBE LIQUID-LEVEL GAUGE

This gauge, located above the vapor-return valve, is used when the tank is being filled. By opening the gauge when the tank is partially full, a fog or mist of fuel can be seen coming from the outlet. When the tank is 80 per cent full, the fog or mist will change to a spray of liquid fuel. When filling the tank, the gauge should be opened momentarily at frequent intervals. It should never be left open to let vapor escape. To do so is extremely hazardous and violates all fire and safety codes.



LP-Gas Refueling Connections

FILLING LP-GAS FUEL TANK

CAUTION: Before filling the tank or operating the tractor, familiarize yourself thoroughly with all safety precautions and regulations relative to handling and use of LP-Gas.

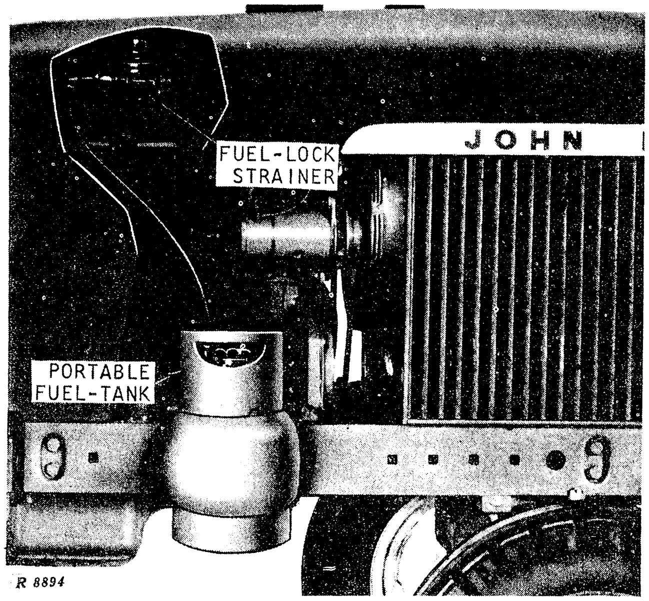
To make filling easier, operate the tractor on vapor fuel for about a half hour before filling the tank. If the engine will not pull the load, return to using liquid fuel.

To fill the tank, first attach the vapor-return hose from the storage tank to the vapor-return valve on the tractor tank. Then attach the liquid-fill hose from the storage tank to the filler valve.

When the fuel tank is about 3/4 full, use the fixed-tube liquid-level gauge at intervals. When fuel comes out in a liquid spray, the tank is 80% full. The tank SHOULD NEVER be filled beyond this point. Do not use electrical fuel gauge when filling the fuel tank.

AUXILIARY LP-GAS FUEL CONNECTION

The connection at the rear of the fuel-lock strainer provides a handy means of attaching a portable pressure tank of LP-Gas fuel if the tractor tank is empty and it is necessary to run the tractor to the fuel storage tank.



Portable Fuel Tank Connected to Tractor

LUBRICANTS

Effective use of lubricating oils and greases is perhaps the most important step towards low-upkeep cost, long tractor life, and satisfactory service.

The engine of this tractor has one of the finest lubricating systems it is possible to design. Do not handicap it by using an oil of doubtful quality. It pays to buy only nationally known brands of oil.

LUBRICATING OILS

Lubricating oils are available in single and multi-viscosity, in various weights or viscosities, and in various grades for types of engine service.

The viscosity (fluid quality) of an oil is expressed by a viscosity number. As the numbers increase, the viscosity or oil body becomes heavier. A multi-viscosity oil may be chosen because it has a range of viscosities. For example, at low temperatures SAE 10W-30 is similar to SAE 10W viscosity oil for easy starting; yet at engine operating temperatures it is similar to SAE 30 viscosity oil.

The use of additives to improve quality brought about the need for defining lubricating oils other than by viscosity alone. The result is that the American Petroleum Institute (API)/SAE and the Internal Combustion Engine Institute (ICEI) have classified oils according to the type of engine service to be encountered.

GASOLINE OR LP-GAS ENGINE OIL CLASSIFICATION

The American Petroleum Institute (API)/SAE classification of oils for gasoline or LP-Gas engines, together with recommendations for use according to service, are as follows:

Service ML—Oil suitable for service typical of gasoline and other spark ignition engines operating under average loads and favorable conditions. (Never use this type of oil in the gasoline or LP-Gas engine.)

Service MM—Oil suitable for service typical of gasoline and other spark ignition engines operating under moderate to severe conditions.

For light to average service conditions, the minimum classification of oil that should be used in a gasoline or LP-Gas engine is oil specified for service MM.

Service MS—Oil suitable for service typical of gasoline and other spark ignition engines operating under unfavorable or severe types of conditions.

For average to severe service, high temperature-heavy load service, or low temperature-start and stop service, use oils specified for service MS.

DIESEL ENGINE OIL CLASSIFICATION

The American Petroleum Institute (API)/SAE classification of oils for diesel engines, together with recommendations for use according to service, are as follows:

Service DG—Service typical of diesel engines where there are no severe requirements for wear or deposit control due to fuel, lubricating oil, or to engine design characteristics. (Never use this oil in the diesel engine.)

Service DM—Service typical of diesel engines operating under severe conditions or using fuels of a type tending to promote deposits and wear but where there are design characteristics or operating conditions which may make the engine either less sensitive to fuel effects or more sensitive to residues from lubricants.

For normal service conditions when the fuel contains less than 0.5% sulphur, use oil classified for service DM. Supplement-1 level or S-1 oil (ICEI classification) is similar to service DM (API classification) and may also be used.

Service DS—Service typical of diesel engines operating under very severe conditions or having design characteristics or using fuel tending to produce excessive wear or deposits.

When fuel contains more than 0.5% sulphur, for high temperature-heavy load service, or for exceptionally severe service conditions use oil classified for service DS (API classification). Series 3 or S-3 (ICEI classification) type of oil may also be used.

NOTE: Service DS or S-3 oils may not have the anti-scuff protection found in service DM or S-1 oils.

ENGINE OR AIR CLEANER OIL VISCOSITY

Depending upon the prevailing air temperature, use the following weight of oil in the engine crankcase and air cleaner:

DIESEL

Air Temperature	Single-Viscosity Oil	Multi-Viscosity Oil
Above 32° F.	SAE 30	SAE 20W-40
-10° F. to 32° F.	SAE 10W	SAE 10W-30
Below -10° F.		SAE 5W-20*

GASOLINE OR LP-GAS

Air Temperature	Single-Viscosity Oil	Multi-Viscosity Oil
Above 90° F.	SAE 30	SAE 20W-40
32° F. to 90° F.	SAE 20W	SAE 10W-30
-10° F. to 32° F.	SAE 10W	SAE 10W-30
Below -10°F.	SAE 5W*	SAE 5W-20

**Use of SAE 5W or 5W-20 oil may cause some increase in oil consumption. Check oil level more often when using this oil.*

Be sure to select the oil you will use both by viscosity and by expected type of engine service; for example - SAE 20W-40, Service DS, for diesel engines; or SAE 20W-40, Service MS, for gasoline or LP-Gas engines.

TRANSMISSION-HYDRAULIC OIL SPECIFICATIONS

Use only John Deere Type 303 Special Purpose Oil or its equivalent in the transmission-hydraulic system of your tractor. Other types of oil will not give satisfactory service and may result in eventual damage to the transmission or hydraulic system.

The Special Oil, available from your John Deere dealer, may be used in all types of weather conditions.

BELT PULLEY OIL SPECIFICATIONS

Use the same John Deere Type 303 Special-Purpose Oil or its equivalent as used in the transmission-hydraulic system in the belt pulley of your tractor, if it is so equipped.

GREASES

SAE multipurpose-type grease is recommended for all grease fittings, and wheel bearing grease for the front wheel bearings on your tractor.

Greases differ from oils in that they consist of oils and thickening agents, usually a special type of soap. Wheel bearing grease, made from soda soap for resistance to the effects of heat, is too stiff for dispensing through grease guns. SAE multipurpose-type grease, made from lithium soap for extreme resistance to both heat and water washing, has a broad range of uses. Grease fittings are conveniently located at points on the tractor and its optional equipment.

Single applications of these greases provide lubrication for a relatively long period and serve the important function of helping to keep contamination out of bearings.

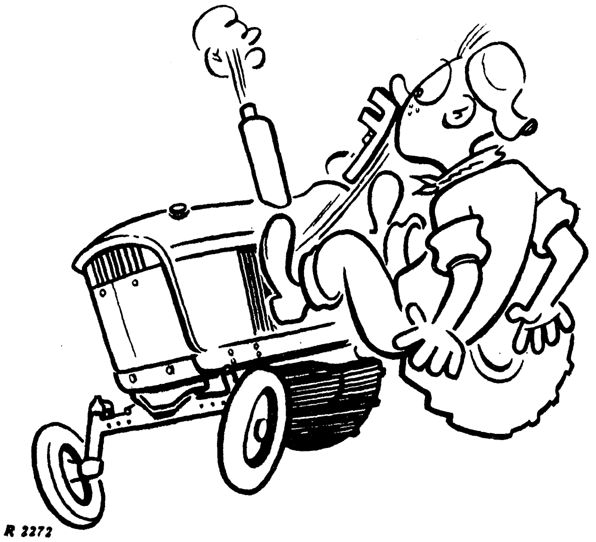
STORING LUBRICANTS

Use clean containers to store and handle all lubricants. Your tractor can operate at top efficiency only if clean lubricants are used.

This tractor is equipped with safeguards, such as the air cleaner, oil seals, and oil filters, which are designed to keep dust, dirt, and other abrasives from reaching operating parts. Clean lubricants will help these safeguards do their jobs properly.

ADDING LUBRICANTS

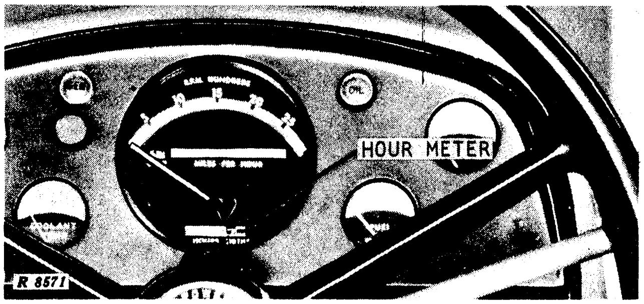
Add lubricants periodically at the recommended lubrication and service intervals (pages 48-49). Be sure to follow the recommended intervals carefully.



CAUTION: Do not lubricate or adjust the tractor while the engine is running unless specifically recommended.

LUBRICATION AND PERIODIC SERVICE

The intervals at which the various working parts of your tractor should be checked, lubricated, serviced, or adjusted are based on hours of operation.



R 8571

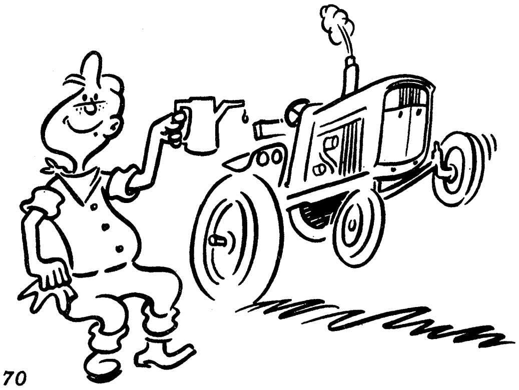
Hour Meter

Use the hour meter to determine when periodic services are required. The hour meter, which operates whenever the engine is running, shows the accumulated hours of operation.

BREAK-IN PERIOD

During the break-in period, follow the special procedures given on pages 10 and 53. Change the engine oil and oil filter element as specified on page 10. At the end of the first 200 hours, change the transmission-hydraulic system filter elements.

The break-in period is vitally important to the long life and satisfactory performance of your tractor.



R2270

The Tractor Will Respond to Proper Lubrication

LUBRICATION AND SERVICE INTERVALS

The lubrication and service periods for this tractor are daily or every 10 hours, every 50 hours, every 200 hours, every 600 hours, every 1200 hours, and every spring and fall season. These intervals are based on operation under normal conditions. When the tractor is operated under unusual conditions, such as excessive heat, cold, or dust, the tractor should be checked and serviced at MORE FREQUENT INTERVALS.

The chart which follows is a condensed list of the tractor components to be serviced at each interval and the service to be performed. Detailed instructions for performing each service are given on the pages which follow the chart. Each item in the chart is numbered, with the corresponding detailed procedure bearing the same number.

Perform the indicated service when the item number is in the column under the type of engine in your tractor.

R 2237

Since loose clothing might catch in moving parts, always keep sleeves, jackets, or other clothing relatively tight and belted.

DAILY OR EVERY 10 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
1	1	1	Engine crankcase	Check oil level	To "FULL" mark	See page 45 for engine oil viscosity and type of Service
2	2	2	Radiator	Check coolant level	To within 1-1/4 inches of bottom of filler neck	....
3	3	3	Air cleaner	Check dirt and oil level in cup	To top of inner bowl	See Item No. 1
4	4	4	Pre-cleaner	Check collector bowl	....	....
5	5		Fuel pump	Check sediment bowl	....	....
6	6	6	Wide-swing drawbar	Lubricate fittings	Several shots of grease	SAE multipurpose-type grease
7	7	7	Front axle	Lubricate fittings	Several shots of grease	SAE multipurpose-type grease
8	8	8	Hi-crop rear axle	Lubricate fittings	Several shots of grease	SAE multipurpose-type grease
9	9	9	Front wheels and rear axle	Service only when tractor has been operated in extremely wet and muddy conditions. See detailed instructions.		

EVERY 50 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
10	10	10	Power take-off clutch	Lubricate bearing	5 shots of grease	SAE multipurpose-type grease

EVERY 200 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
11	11	11	Air cleaner	Drain, clean, and fill	To top of inner bowl	See Item No. 1
12	12	12	Engine crankcase	*Drain and fill. Replace filter	8 U.S. quarts	See Item No. 1
		13	Carburetor	Drain sump	....	....
14	14	14	Generator belt	Check tension	1-inch flex with 25-pound force	....
	15	15	Distributor cam	Lubricate cam	Trace	Cam lubricant
16	16	16	Transmission clutch	Lubricate throw-out bearing	5 shots of grease	SAE multipurpose-type grease
17	17	17	Belt pulley	Check oil level	To level of filler hole	**John Deere Type 303 Special-Purpose Oil
18	18	18	Transmission and hydraulic system	Check oil level; ***Replace filter element	To top of "SAFE" range	**John Deere Type 303 Special-Purpose Oil
19	19	19	Batteries	Clean and check electrolyte level	To bottom of filler neck	....
20	20	20	Power brakes	Bleed brakes	....	....
21	21	21	Tires	Check air pressure	See page 20	....
22	22	22	Clutch pedal	Check free travel	1-1/2 inch with engine operating at 1900 rpm	....
23	23	23	Hi-Crop final drive housing	Check oil level	To filler hole level	Above 32°F., SAE 90 multipurpose-type gear lubricant; Below 32°F., SAE 80 multipurpose-type gear lubricant
24	24	24	3-point hitch (row-crop and standard)	Lubricate fittings	Several shots of grease	SAE multipurpose-type grease

**Under extreme operating conditions, it may be necessary to perform this service at more frequent intervals.*

***Or its equivalent.*

****Perform this service on a new tractor at the end of the first 200 hours of operation. Then change the element every 600 hours.*

EVERY 600 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
25	25	25	Air intake hoses	Check hose connections to engine	....	....
26	26	26	Air cleaner	Clean inlet tube and oil trap	4 U.S. pints (diesel) 2-1/4 U.S. pints (gasoline or LP-Gas)	See Item No. 1
		27	Fuel-lock strainer	Drain	....	....
28	28	28	Fuel pump sediment bowl and fuel tank	Clean sediment bowl and fuel strainer	....	....
29			Fuel filter	Replace first-stage filter element	....	....
30	30	30	Intake and exhaust valves	Check valve clearance	0.018-inch (diesel) 0.015-inch (In. gasoline or LP-Gas) 0.028-inch (Ex. gasoline or LP-Gas)	....
31			Fuel injectors	Remove and clean*	....	....
32			Injection pump	Check timing*	....	....
	33	33	Distributor points	Set point gap	0.022-inch	....
			Timing	Check with timing light	See page 64	....
	34	34	Spark plugs	Clean and set gap	0.025-inch (gasoline) 0.015-inch (LP-Gas)	....
35	35	35	Engine	Check idle speeds	....	....
36	36	36	Transmission and hydraulic system	Replace filter element and clean breather filter	....	....
37	37	37	Belt pulley	Drain, flush, and fill	2-1/2 U.S. pints	**John Deere Type 303 Special-Purpose Oil

EVERY 1200 HOURS

Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
38	38	38	Transmission and hydraulic system	Drain and fill	11 U.S. gallons (Power Shift) 8 U.S. gal. (Syncro-Range)	**John Deere Type 303 Special-Purpose Oil
39	39	39	Front wheel bearings	Clean, repack, and adjust	....	Wheel bearing grease
40	40	40	Rear axle bearings (row-crop and standard)	Lubricate fittings	6 to 8 shots of grease	SAE multipurpose-type grease
41	41	41	Hydraulic pump	Clean valve filter*	....	....
42	42	42	Hi-Crop final drive housing	Drain and fill	1-3/4 U.S. quarts	Above 32°F., SAE 90 multipurpose-type gear lubricant; Below 32°F., SAE 80 multipurpose-type gear lubricant

EVERY SPRING AND FALL SEASON

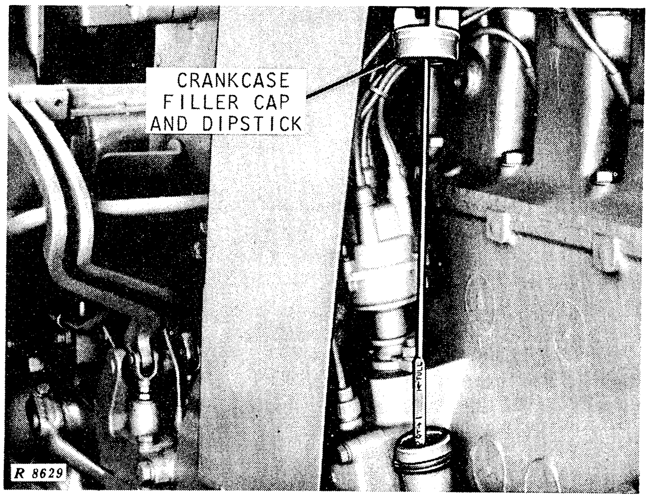
Item No.			Component	Service	Capacity or Measurement	Type of Lubricant
Diesel	Gas	LP-Gas				
43	43	43	Cooling system	Drain, flush, and fill	19 U.S. quarts	....
44	44	44	Engine crankcase	Drain and fill. Replace filter	8 U.S. quarts	See Item No. 1

**See your John Deere dealer for this service.*
***Or its equivalent.*

DETAILED PERIODIC SERVICES

DAILY OR 10 HOUR SERVICE

1. CHECKING ENGINE CRANKCASE OIL LEVEL



Crankcase Filler Cap and Dipstick

With the tractor on level ground, remove the crankcase filler cap. Obtain the engine oil level on the dipstick with the cap resting on top of the threads. If the oil level is down to the "2 QT." mark on the dipstick, add sufficient oil of the proper weight and quality to bring the oil level up to the "FULL" mark.

2. CHECKING RADIATOR COOLANT LEVEL

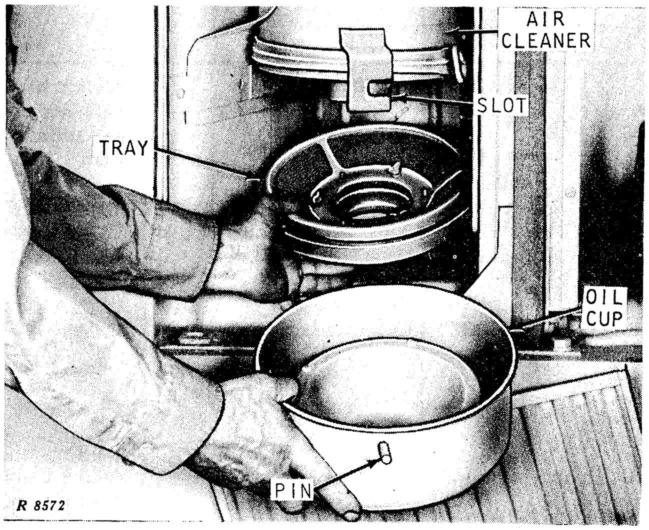
With the tractor on level ground, remove the radiator filler cap (next to the muffler) and check the coolant level. Add clean soft water (summer) or antifreeze (winter) if the coolant level is more than 1-1/4 inches below the bottom of the filler neck.

Check the pressurized cooling system for loose connections or leaks after adding coolant. If pressure is not maintained, loss of coolant and overheating will result. Tighten the filler cap.

CAUTION: Remove the radiator filler cap only when the coolant temperature is below the boiling point (in the "N" range on the water temperature gauge). Then loosen the cap slightly to the stop to relieve pressure before removing the cap completely.

3. CHECKING AIR CLEANER

Release the left-hand side grille screen (page 57) and remove the air cleaner oil cup. If the dirt in the bottom of either bowl exceeds 3/8 inch, or if the oil is too thick with dirt to flow freely, clean out the cup.



Removing Diesel Air Cleaner Oil Cup and Tray

CAUTION: Do not check the air cleaner with the engine running. When tightening clamp, make sure oil cup is all the way up.

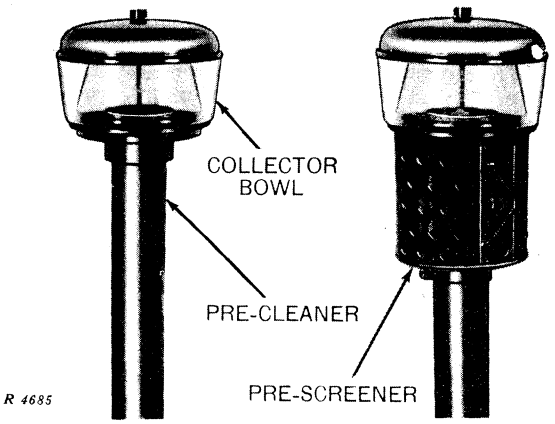
If the oil cup required cleaning, add new oil of the proper viscosity (page 45). Bring the oil level in both the inner and outer bowls to the top of the inner bowl.

If the oil appears clean but the oil level is low, merely add the proper oil. Install the oil cup. When installing a diesel air cleaner oil cup, hold it up in place and rotate it so the pins on the oil cup engage the slots on the air cleaner and tighten clamp securely. Install the side grille screen.

NOTE: Under extremely dirty operating conditions, it may be necessary to check the air cleaner twice a day or after every five hours.

4. CHECKING PRE-CLEANER COLLECTOR BOWL

If tractor has a pre-cleaner or pre-screener, check and if necessary clean the collector bowl or screen.



Pre-Cleaner and Pre-Screener

5. CHECKING FUEL PUMP SEDIMENT BOWL (Diesel or Gasoline)

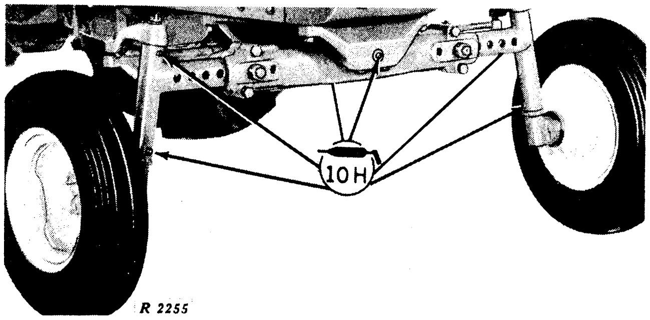
Check sediment bowl and clean it if any water or an excess of foreign matter is present. See page 58. Water will ruin a diesel fuel filter.

6. LUBRICATING WIDE-SWING DRAWBAR

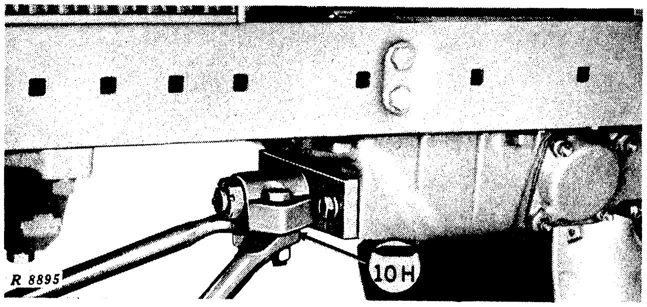
If the tractor has a wide-swing drawbar, apply several shots of SAE multipurpose-type grease to the drawbar rollers.

7. LUBRICATING FRONT AXLE

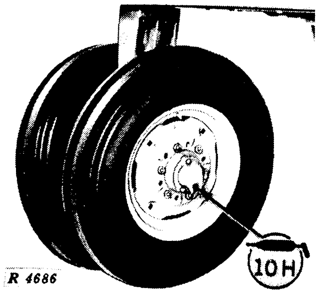
If tractor has a wide front axle, apply several shots of SAE multipurpose-type grease to the pivot pins and steering spindles (6 fittings). On Hi-Crop tractors with radius rods, also apply several shots of grease to the radius rod pivot grease fitting. If the tractor has a Roll-O-Matic front axle, apply SAE multipurpose-type grease at the two fittings until grease appears at the felt seals.



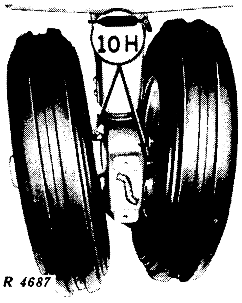
Wide Front Axle Grease Fittings



Radius Rod Pivot Grease Fitting



Front Wheel Grease Fitting



Roll-O-Matic Grease Fittings

8. LUBRICATING HI-CROP REAR AXLE

On Hi-Crop tractors, apply several shots of SAE multipurpose-type grease to the grease fittings on the end of the rear axle. See illustration on page 53.

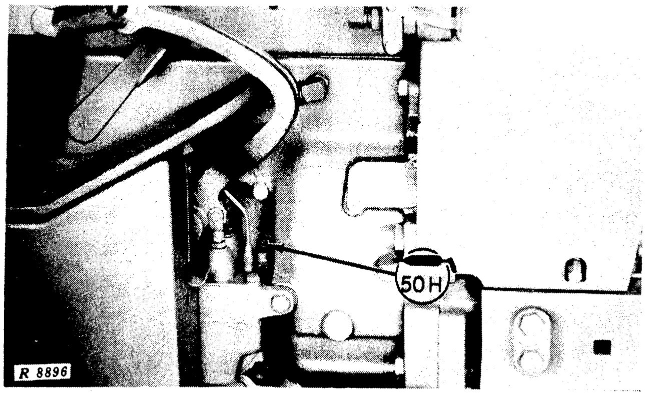
9. LUBRICATING FRONT WHEELS (All Tractors) AND REAR AXLES (Row-Crop and Standard Tractors)

When the tractor is being operated in extremely wet and muddy conditions, grease each front wheel and rear axle (page 56) daily or every 10 hours. To do so, remove the pipe plugs, install fittings, and apply several shots of SAE multipurpose-type grease. CONTINUE lubricating the front wheels at this interval until the bearings can be cleaned and packed with wheel bearing grease.

50 HOUR SERVICE

Perform items 1 through 9 in the regular daily or 10-hour service in addition to the following.

10. LUBRICATING PTO CLUTCH BEARING (Syncro-Range Tractors)



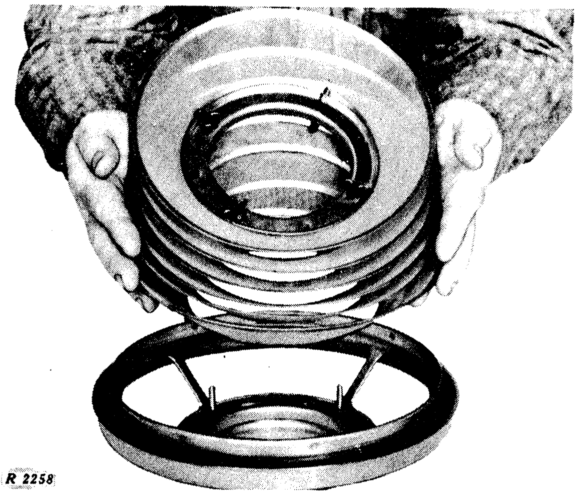
PTO Clutch Bearing Grease Fitting

Every 50 hours that the PTO clutch lever is engaged, apply five shots of SAE multipurpose-type grease at the grease fitting. When operating in hot climates, use Texaco TG 3007 high temperature grease or its equivalent in place of SAE multipurpose-type grease.

200 HOUR SERVICE

Perform item 2 and items 4 through 9 in the regular daily or 10 hour service; item 10 in the 50 hour service in addition to the following.

11. DRAINING, CLEANING, AND FILLING AIR CLEANER

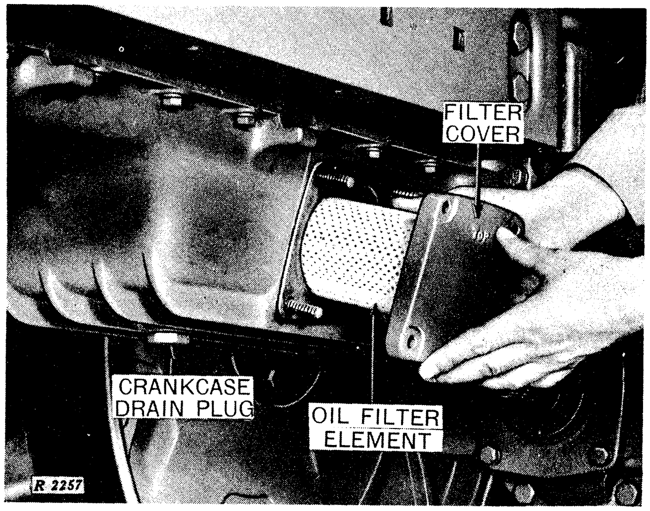


Disassembling the Diesel Engine Air Cleaner Tray

Gasoline or LP-gas engine air cleaners do not have a tray. Otherwise, the cleaner is serviced the same as the following instructions for diesel engines.

Release the left-hand side grille screen, remove the oil cup and tray, and pour the oil from the cup. Disassemble the tray and wash it thoroughly in solvent. Thoroughly clean the oil cup. Fill the inner and outer bowls of the oil cup with the proper viscosity oil to the top of the inner bowl. Total oil cup capacity is 4 U.S. pints for diesel, or 2-1/4 U.S. pints for gasoline and LP-Gas engines. Assemble and install the oil tray and oil cup. Replace the side grille screen.

12. DRAINING AND FILLING CRANKCASE



Replacing Crankcase Oil Filter Element

With the engine warm, remove the crankcase drain plug and drain the oil from the crankcase.

Remove the crankcase filter cover. Pull out the oil filter element and clean the filter compartment. Install a new filter element and, if necessary, replace the filter cover gasket. Install the filter cover. Change the filter element each time the oil is changed.

Install the crankcase drain plug and add new oil of the proper viscosity and quality (page 45). Run the engine to fill the oil filter. The oil level on the dipstick should be at the "FULL" mark. Total capacity is 8 U.S. quarts.

NOTE: Certain operating conditions or changes in oil quality may necessitate a more frequent oil change period.

Keep a record of all oil and filter changes on the oil and filter change stickers that come with the filters.

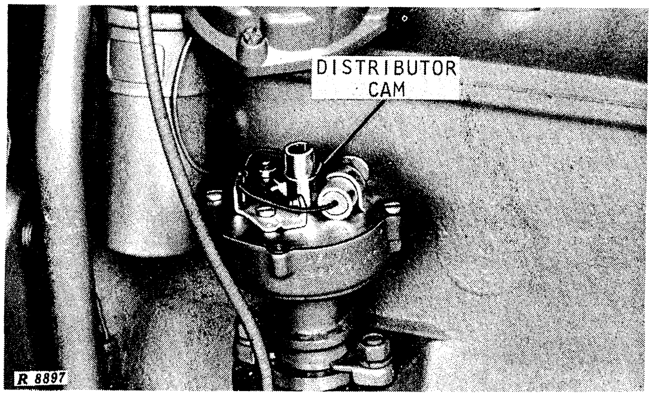
13. DRAINING CARBURETOR SUMP (LP-Gas)

See page 62.

14. CHECKING GENERATOR BELT TENSION

See page 68.

15. LUBRICATING DISTRIBUTOR (Gasoline or LP-Gas)

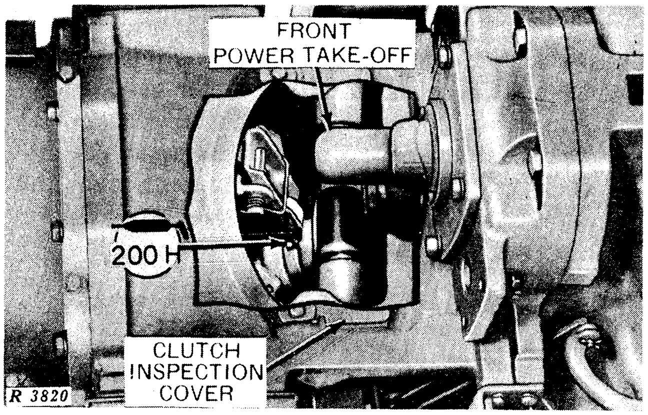


Distributor Cam

Remove, clean, and inspect the distributor cap, rotor, and housing cover. Replace all defective parts. Apply a trace of distributor cam lubricant or high-temperature grease on the cam. Too much lubricant will ruin the distributor points.

16. LUBRICATING TRANSMISSION CLUTCH THROW-OUT BEARING (Syncro-Range Tractors)

With the tractor engine stopped, remove the clutch inspection cover on the underside of the tractor. Apply five shots of SAE multipurpose-type grease at the grease fitting.

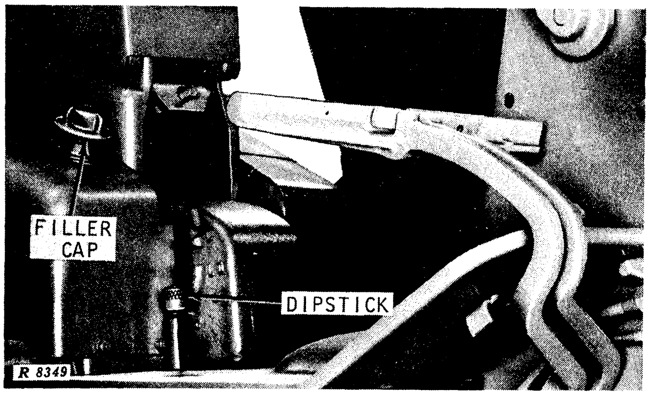


Clutch Throw-Out Bearing Grease Fitting (As Viewed from Beneath Tractor)

17. CHECKING BELT PULLEY OIL LEVEL

After every 200 hours of belt pulley operation, remove the belt pulley filler plug (see page 55) and check the oil level. If the oil is not up to the level of the filler hole, add John Deere Type 303 Special-Purpose Oil or its equivalent.

18. CHECKING TRANSMISSION AND HYDRAULIC SYSTEM OIL LEVEL



Transmission-Hydraulic System Filler Cap and Dipstick

With the tractor on level ground, remove the dipstick. Obtain the oil level on the dipstick with the cap resting on top of the threads. If the oil level is down to the "ADD" mark at the bottom of the "SAFE" range on the dipstick, remove the filler cap and add John Deere Type 303 Special-Purpose Oil or its equivalent to bring the oil level to the mark at the top of the "SAFE" range. Replace the transmission oil filter element after the first 200 hours of operation; thereafter replace the element every 600 hours. See page 55.

19. SERVICING THE BATTERY

Clean the battery and check the electrolyte level on each battery cell. See page 67.

20. BLEEDING POWER BRAKES

See page 72.

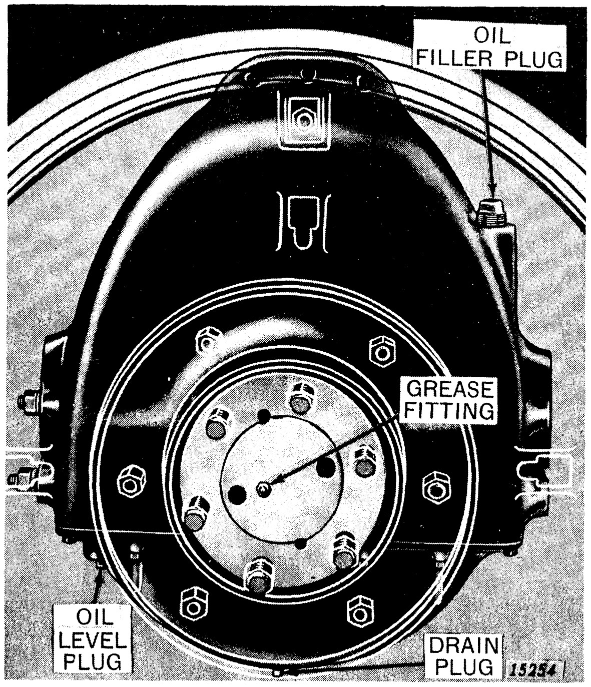
21. CHECKING TIRE PRESSURE

Check the tires for proper inflation pressure given on page 20. Check tires for possible injury (page 72).

22. CHECKING CLUTCH PEDAL FREE TRAVEL (Syncro-Range Tractors)

Check the clutch pedal free travel with the engine operating at 1900 rpm, as explained on page 72, and adjust the pedal if necessary.

23. CHECKING FINAL DRIVE HOUSING OIL LEVEL (Hi-Crop Tractors)

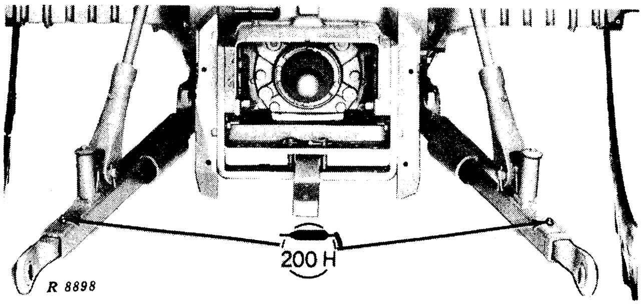


Hi-Crop Rear Axle Grease Fitting and Final Drive Housing Oil Plugs

Remove the oil level plug from each final drive housing and check the oil level. If low, add lubricant at the filler plug until oil starts to come out of the level plug hole. With temperatures above 32° F., use SAE 90 multipurpose-type gear lubricant. With temperatures below 32° F., use SAE 80 multipurpose-type gear lubricant.

An ounce of care can prevent a pound of cure—service your tractor at the recommended intervals, using the correct lubricant.

24. LUBRICATING 3-POINT HITCH (Row-Crop and Standard Tractors)



Draft Link Grease Fittings

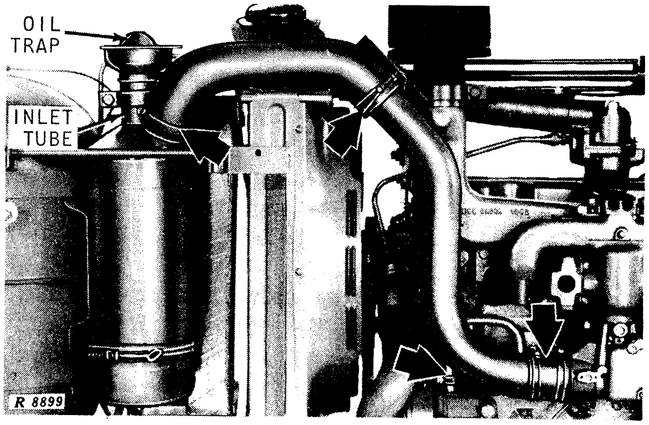
Grease the 3-point hitch draft links by applying three or four shots of SAE multipurpose-type grease at each fitting.

600-HOUR SERVICE

Perform items 2, 4, and 6 through 9 in the regular daily or 10-hour service; item 10 in the 50-hour service; and items 12 through 16 and 18 through 24 in the 200-hour service in addition to the following.

25. CHECKING AIR CLEANER CONNECTIONS

Remove the hood (page 57) and check the clamps on the hoses which connect the air cleaner and engine. Tighten the hose connections where necessary. This will help to prevent dirt or sediment from entering through loose connections.



Air Cleaner and Connections (Gasoline or LP-Gas Engine)

26. SERVICING AIR CLEANER

With the hood removed, remove the air cleaner oil cup. On gasoline or LP-Gas engines, also remove and clean the oil trap. Swab out the air cleaner inlet tube. Clean the exterior of the radiator cores, oil cooler core, and grille screens. Service the oil cup. On diesel engines service the air cleaner tray (page 52). Replace oil cup and the tray (diesel) or the oil trap (gasoline or LP-Gas).

27. DRAINING FUEL-LOCK STRAINER (LP-GAS)

See page 62.

28. CLEANING FUEL TANK SEDIMENT BOWL AND FUEL TANK SUMP.

See page 58.

29. REPLACING FUEL FILTER ELEMENT (Diesel)

Replace the first-stage fuel filter element. See page 59. After the filter element is replaced, bleed the fuel system as explained on page 59.

30. CHECKING VALVE CLEARANCE

Check valve clearance and adjust the valves if necessary. See page 71.

31. CLEANING FUEL INJECTORS (Diesel)

Remove the fuel injectors as explained on page 59 and have them cleaned by your John Deere dealer. This service is extremely important to efficient fuel system operation.

32. CHECKING INJECTION PUMP TIMING (Diesel)

Timing of the injection pump and fuel injectors is also vital to efficient fuel system operation. See your John Deere dealer for this service.

33. CHECKING DISTRIBUTOR (Gasoline or LP-Gas)

Setting Distributor Point Gap

Check the point clearance. See page 63.

Timing Distributor

With a timing light, check the distributor timing and adjust it if necessary. See page 64.

34. CLEANING AND SETTING SPARK PLUGS (Gasoline or LP-Gas)

See page 64.

35. CHECKING ENGINE IDLE SPEEDS

With the engine at operating temperature, use the speed-hour meter to check the engine speeds:

GASOLINE OR LP-GAS ENGINES

Throttle Positions	Throttle	Load Speed	No Load Idle Speed
Up, Knob Out	Hand	. . . .	*420 rpm
Up, Knob In	Hand	. . . .	650 rpm
Down, Knob In	Hand	2100 rpm	2360 rpm
Down, Knob Out Pedal Down	Hand Foot	2500 rpm	2690 rpm

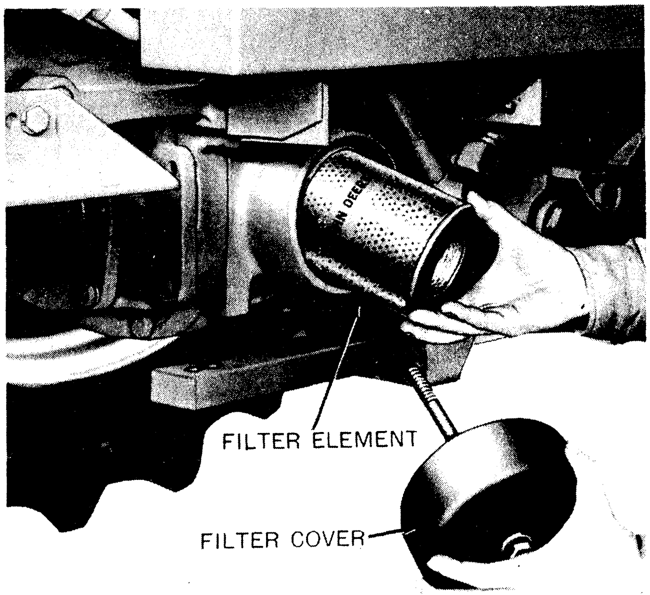
**500 rpm on LP-Gas engines.*

DIESEL ENGINES

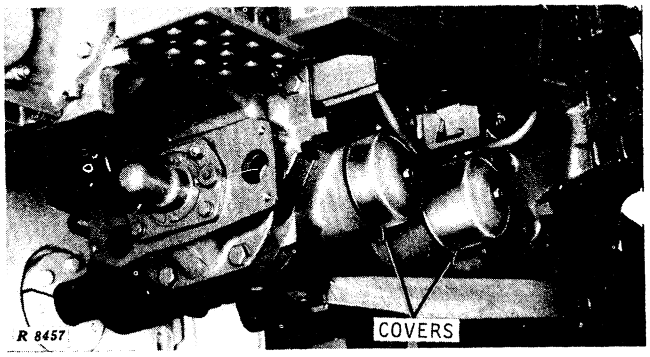
Throttle Positions	Throttle	Load Speed	No Load Idle Speed
Up	Hand	. . . .	600 rpm
Down, Knob In	Hand	2100 rpm	2270 rpm
Down, Knob Out Pedal Down	Hand Foot	2500 rpm	2650 rpm

If the idle speeds need to be adjusted or if there is doubt as to the accuracy of the speed-hour meter, consult your John Deere dealer.

36. REPLACING TRANSMISSION-HYDRAULIC SYSTEM OIL FILTER ELEMENT AND CLEANING BREATHER FILTER



Removing Transmission-Hydraulic System Oil Filter Element (Syncro-Range Tractor)

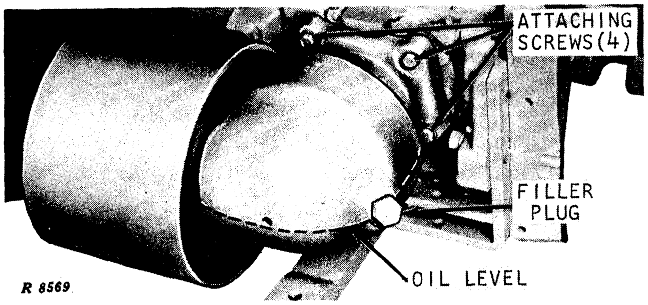


Transmission-Hydraulic System Filter Covers (Power Shift Tractors)

With the engine stopped, remove the transmission-hydraulic system oil filter covers (Syncro-Range tractors have one oil filter) and pull out the oil filter elements. Install new filter elements and replace the filter cover gasket. Install and tighten the filter covers. Do not over tighten.

Remove the transmission-hydraulic system filler cap (page 53) and wash the breather filter inside the cap in diesel fuel.

37. DRAINING, FLUSHING, AND FILLING BELT PULLEY



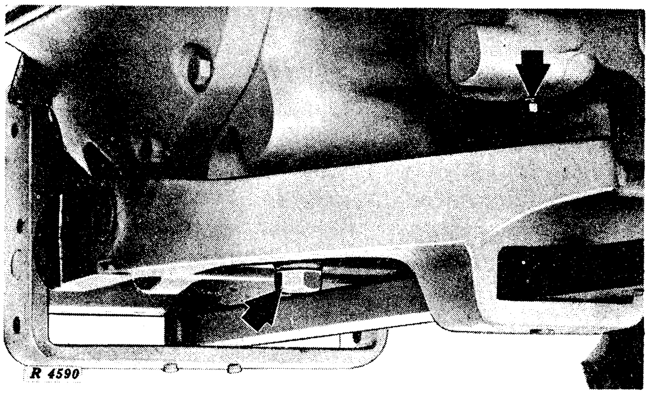
Belt Pulley Filler Plug and Attaching Screws

After every 600 hours of belt pulley operation, drain, flush, and fill the belt pulley with new oil. To do so, remove the belt pulley from the tractor. Then remove the filler plug and tilt the assembly to drain the oil. Flush the reservoir with diesel fuel. Drain the flushing agent, install the belt pulley on the tractor, and fill it with new John Deere Type 303 Special-Purpose Oil or its equivalent to the level of the filler hole. Replace the filler plug. Capacity is 2-1/2 U.S. pints.

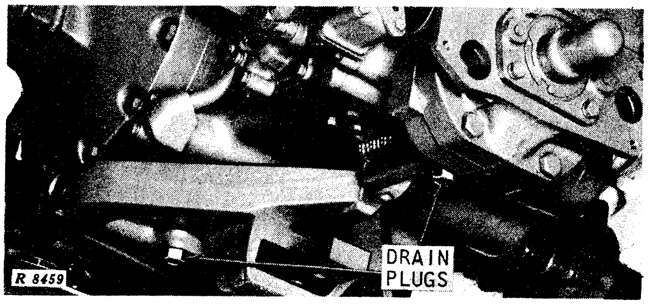
1200 HOUR SERVICE

Perform items 2, 4, 6, 7, and 8 in the regular daily or 10 hour service; item 10 in the 50 hour service; items 12 through 16, 19 through 22, and item 24 in the 200 hour service; and items 25 through 37 in the 600 hour service in addition to the following.

38. DRAINING AND FILLING TRANSMISSION-HYDRAULIC SYSTEM



Transmission-Hydraulic System Drain Plug (Syncro-Range Tractors)



Transmission-Hydraulic System Drain Plugs (Power Shift Tractors)

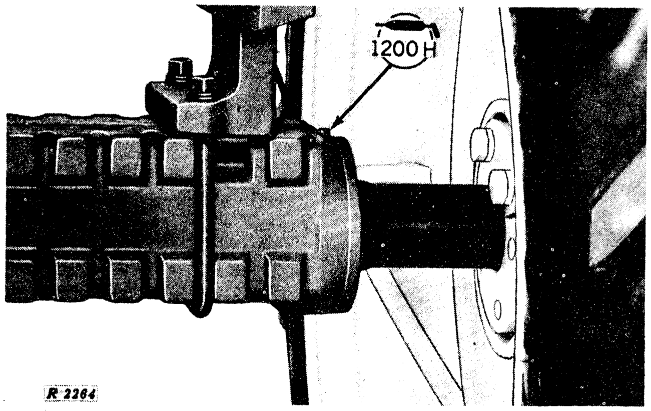
With the engine warm, remove the transmission-hydraulic system drain plugs and drain the oil. Replace the drain plugs.

Add new John Deere Type 303 Special-Purpose Oil or its equivalent at the filler cap. Bring the oil level on the dipstick to the top of the "SAFE" range. Transmission-hydraulic system capacity when drained and the filter changed is 8 U.S. gallons for Syncro-Range tractors and 11 U.S. gallons for Power Shift tractors.

39. LUBRICATING FRONT WHEEL BEARINGS

Clean and pack the front wheel bearings and oil seal. Adjust the front wheel bearings. See page 73.

40. LUBRICATING REAR AXLE BEARINGS (Row-Crop and Standard Tractors)



Rear Axle Grease Fitting

Grease the rear axle bearings by removing the pipe plug on each end of the axle, installing a grease fitting, and applying 6 to 8 shots of SAE multipurpose-type grease at each fitting. Remove the fittings and replace the pipe plugs.

41. CLEANING HYDRAULIC PUMP VALVE FILTER

See your dealer.

42. DRAINING AND FILLING FINAL DRIVE HOUSING (Hi-Crop Tractors)

Remove the drain plug from each final drive housing and drain the oil (see illustration on page 53). Replace the drain plugs. Remove the oil level plugs and filler plugs. Fill each housing until the level is up to the filler hole. At temperatures above 32° F., use SAE 90 multipurpose-type gear lubricant. At temperatures below 32° F., use SAE 80 multipurpose-type gear lubricant. Capacity of each housing is 1-3/4 U.S. quarts.

SEASONAL SERVICE

Before and after the winter season, perform the following services. When placing the tractor in storage, use the instructions on page 74.

43. DRAINING AND FILLING CRANKCASE

Drain and fill the engine crankcase with new oil of the proper weight and quality to conform with expected temperature conditions (page 45). Replace the crankcase filter element. Total crankcase capacity is 8 U.S. quarts.

44. CLEANING COOLING SYSTEM

For efficient operation, drain, flush, and fill the cooling system with the proper coolant. See page 65.

SERVICE

The instructions on the following pages will help you keep your tractor performing efficiently and economically. Many of these service procedures are required at periodic intervals; see pages 50 through 56. Some of the periodic services require dealer assistance. Consult him at these intervals to keep your tractor in top-notch condition.

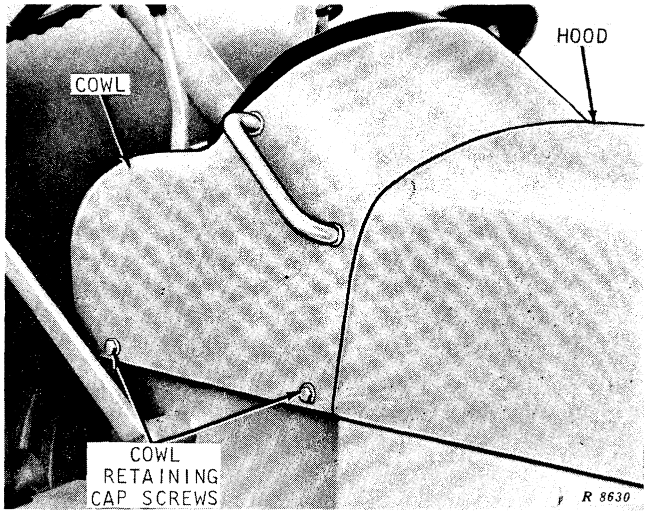
DEALER SERVICES

Your John Deere dealer offers complete tractor service. His factory-trained personnel have access to accurate, detailed service information. Some of the dealer services are listed below.

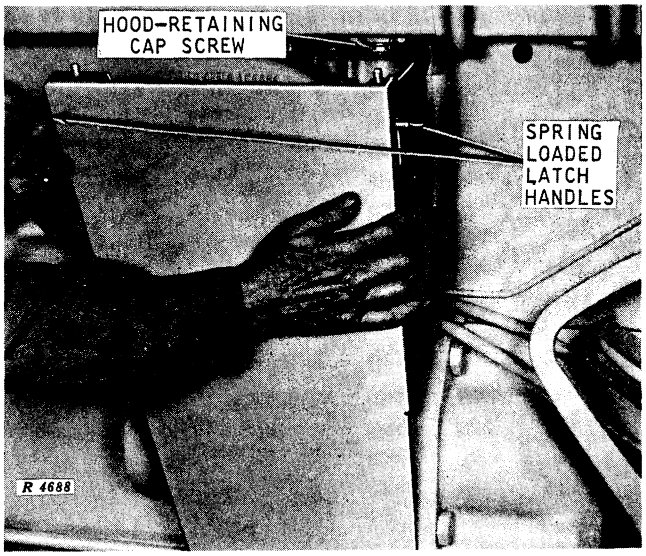
(1) Engine tune-up.
(2) Injection pump and nozzle service.
(3) Ignition and electrical system checks.
(4) Engine and PTO clutch adjustments.
(5) Hydraulic system service.
(6) Fuel system service.
(7) Cooling system service.
(8) Parts service.

REMOVING HOOD

To perform some service procedures, it is necessary to remove the hood. To do so, first remove the cowl-retaining cap screws and lift the cowl off the tractor. Then pull down the spring-loaded latch handles of each side shield and remove the side shields. Remove the rear hood-retaining cap screws. If tractor has an exhaust muffler cover, remove it.

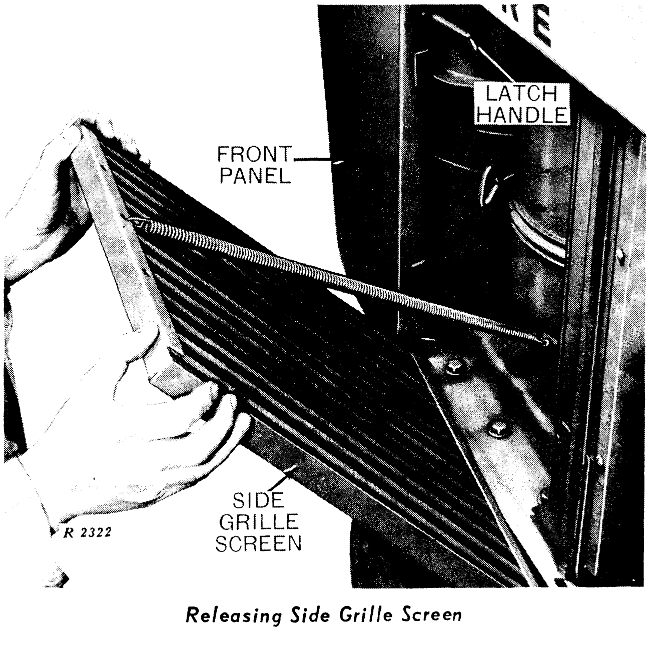


Cowl



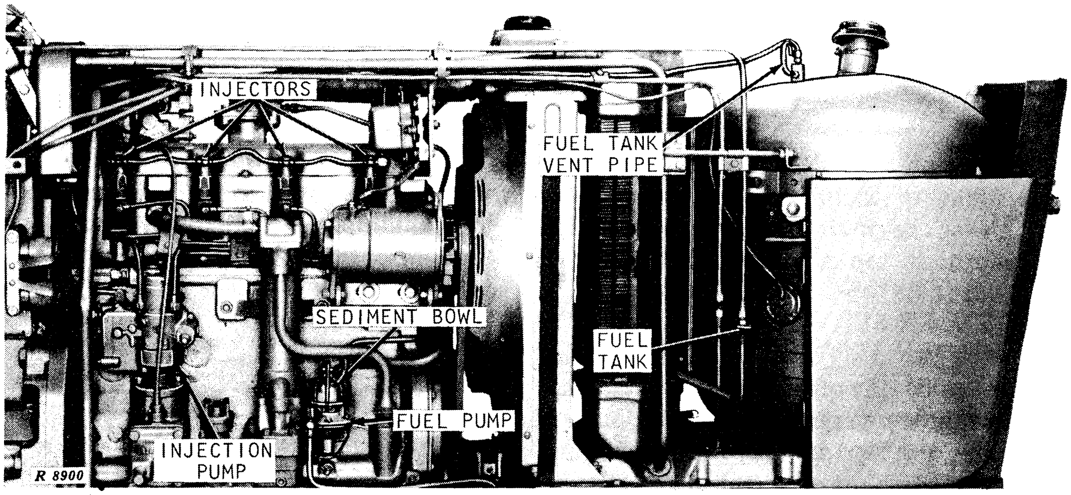
Removing Side Shield

Pull out slightly on the top edge of each side grille screen and lift the screen to clear the pins on the bottom edge. Lower the screen and allow it to hang by the spring. Turn the hood latches outward and remove the hood.



Releasing Side Grille Screen

DIESEL FUEL SYSTEM


INJECTORS
FUEL TANK VENT PIPE
SEDIMENT BOWL
FUEL TANK
FUEL PUMP
INJECTION PUMP
R 8900

Diesel Fuel System Components

DESCRIPTION

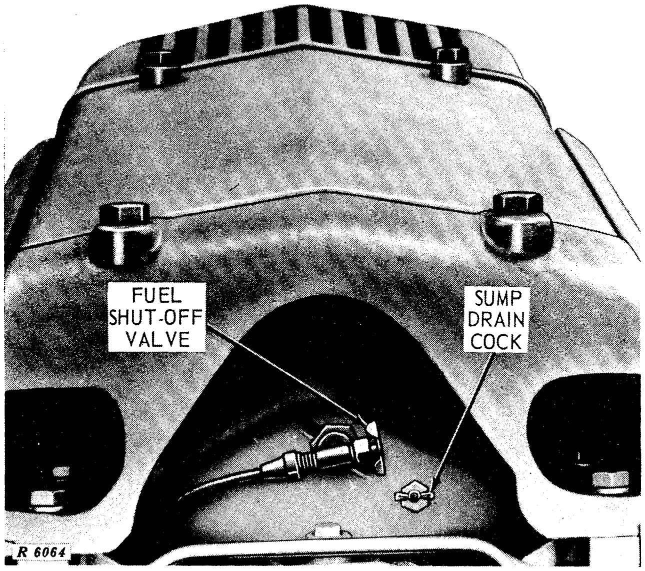
The diesel fuel system consists of the fuel tank, fuel pump with sediment bowl, fuel filters, injection pump, fuel injectors, and the pipes connecting these parts. Capacity of the fuel tank is 29 U.S. gallons.

INSPECTION AND CLEANING

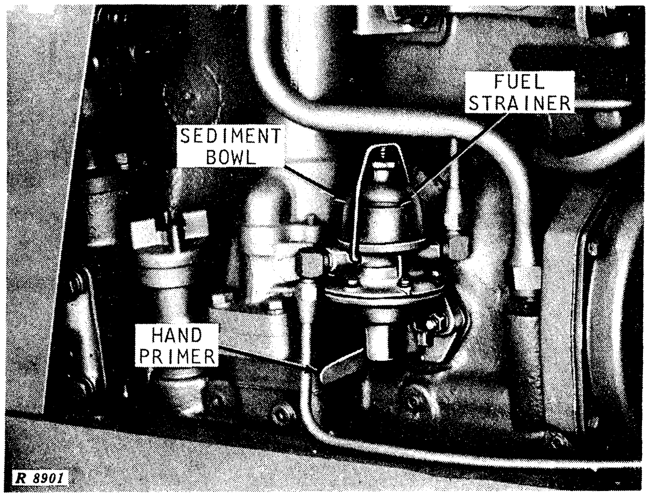
Proper servicing of the fuel system is important. Inspect the fuel pump sediment bowl daily or after every 10 hours of operation. If there is water or an excess of foreign matter, close the fuel shut-off valve. Remove and clean the glass bowl and the fuel strainer. Install the strainer and the bowl, using a good gasket. Open the shut-off valve and bleed the fuel filters.

If water was present in the sediment bowl, drain all water from the fuel tank and the filters to prevent the water from clogging the fuel filters. A standpipe on the fuel shut-off valve provides a sump at the bottom of the fuel tank to trap the water. To drain the sump, open the sump drain cock. If tractor does not have a drain cock, remove the fuel shut-off valve to drain the sump. To drain the fuel filters, loosen the drain plugs on the fuel filters.

Improper fuel storage may require excessive cleaning of the fuel system. After correcting the cause of contaminated fuel, drain the fuel tank sump, clean the sediment bowl, and drain the fuel filters. Have your John Deere dealer check the fuel system.


FUEL SHUT-OFF VALVE
SUMP DRAIN COCK
R 6064

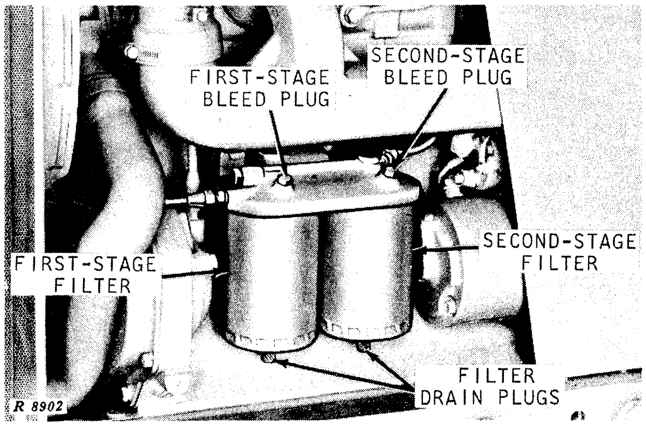
Fuel Shut-Off Valve


FUEL STRAINER
SEDIMENT BOWL
HAND PRIMER
R 8901

Fuel Pump Sediment Bowl

REPLACING FILTER ELEMENT

The fuel filters prevent dirty fuel from reaching the fuel injectors. To avoid difficulties, replace the first-stage filter element every 600 hours of operation or whenever necessary. Replace the second stage filter element at major overhaul or whenever necessary.



Fuel Filters

To replace either of the fuel filters, first close the shut-off valve at the bottom of the fuel tank. Remove the used filter by turning it counter-clockwise off the retaining threads. Install a new O-ring seal on the filter bracket. Tighten securely. Open shut-off valve.

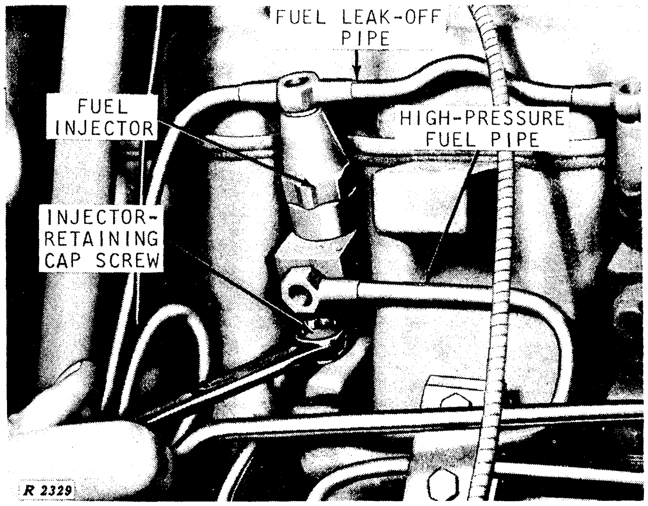
After replacing one of the fuel filter elements, always bleed air from both of the fuel filters.

REMOVING FUEL INJECTORS

Have the injectors cleaned after every 600 hours of operation or whenever necessary. Since special equipment is required to service the injectors, see your John Deere dealer. The following instructions cover only removal and installation.

Remove the hood and disconnect both battery ground straps. Remove the fuel leak-off pipe by disconnecting it at both ends and at each injector. Disconnect and cap the high-pressure fuel pipe at each injector. Remove the injector-retaining cap screws and the injectors. Remove the copper washer from the injector holes in the cylinder head.

NOTE: Cap the holes in the cylinder head and the high-pressure fuel pipes and clean the hollow screws to keep out dirt and other foreign matter. When installing injectors, be sure only one washer is under the injector.



Removing Fuel Injector

Unplug the holes and install injectors using one new copper washer under each injector. Using new washers, connect the high-pressure fuel pipes. Install the fuel leak-off pipe. Make sure all connections and cap screws are tight. Connect the batteries (page 68) and polarize the generator (page 69).

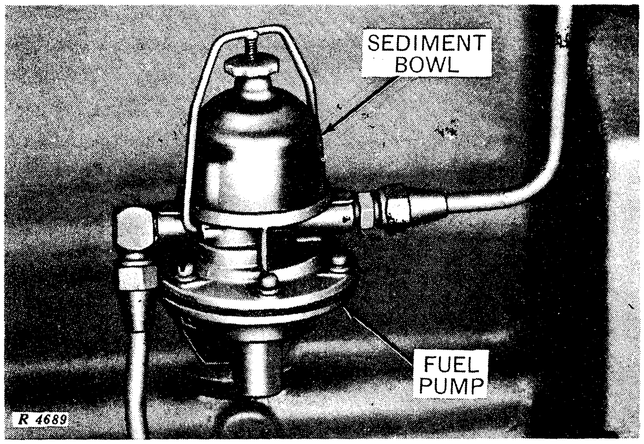
BLEEDING FUEL SYSTEM

Whenever the sediment bowl or a fuel filter is removed or drained, bleed the air from the fuel filters.

To do so, first remove the bleed plug for the first-stage filter. Pump the hand primer on the fuel pump until fuel without foam comes from the bleed plug hole. If the hand primer does not pump fuel and no resistance is felt at the upper portion of the lever stroke, turn the engine with the starter to change the position of the fuel pump cam. Install and tighten the bleed plug. Bleed the second-stage filter in the same manner as the first-stage filter. Leave the hand primer in the down position.

If it is necessary to bleed the entire system, first bleed the filters as instructed above. Then, loosen the high-pressure fuel pipe on at least two of the injectors. Turn the key switch to crank the engine (with the hand throttle in the 1500 rpm position) until fuel without foam flows from the loose connections. Tighten the connections. To bleed the other injector fuel pipes, run the engine until it is operating smoothly.

GASOLINE FUEL SYSTEM



Gasoline Fuel Pump and Sediment Bowl

The gasoline fuel system consists of the fuel tank, fuel pump with sediment bowl, carburetor, and the pipes connecting these parts. Capacity of the fuel tank is 29 U.S. gallons.

INSPECTION AND CLEANING

Proper servicing of the fuel system is important. Inspect the fuel pump sediment bowl daily or after every 10 hours of operation. If there is water or an excess of foreign matter present, clean the sediment bowl and the fuel strainer (page 58). If there was water in the sediment bowl, drain the fuel tank sump (page 58).

CAUTION: Gasoline is flammable.

If the sediment bowl requires cleaning at frequent intervals, improper fuel storage may be the cause. For proper fuel storage, see page 42. After correcting the cause of dirty fuel, clean the sediment bowl and fuel strainer, and have your John Deere dealer clean the fuel tank.

CARBURETOR

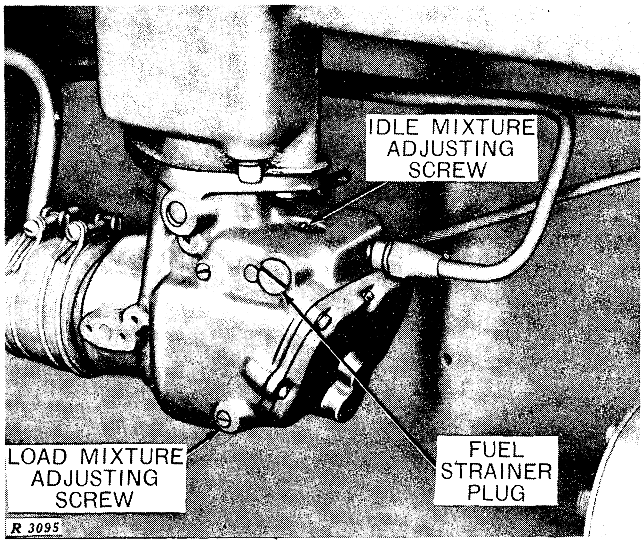
The tractor may be equipped with either one of two types of carburetors as illustrated in the next column.

Cleaning the Carburetor

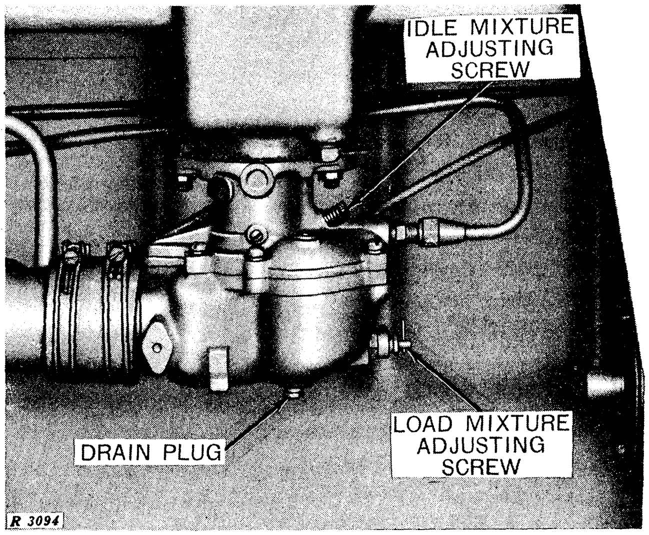
To flush out dirt in the carburetor, remove the drain plug (when provided). After flushing, replace the drain plug.

Idle Mixture Adjustment

With the engine running at operating temperature, place the hand throttle in the 420 rpm idle position (pull out knob and push throttle up against the stop).



Marvel-Schebler Carburetor



Zenith Carburetor

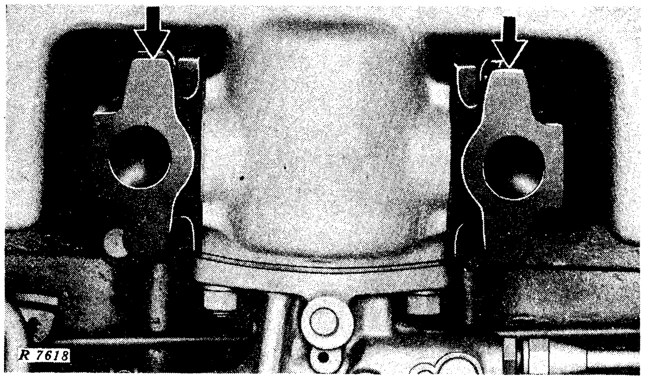
Turn the idle mixture adjusting screw to give maximum engine speed. An average idle adjusting screw setting is 1-1/2 turns open.

Load Mixture Adjustment

The carburetor is equipped with a load mixture adjusting screw. Normally, it is not necessary to change this setting, since the carburetor has limiting main jets. In very hot weather or at high altitude, performance may be improved by closing the screw a slight amount. In very cold weather, open the screw a little. The average setting for the load mixture adjusting screw is 1-1/2 turns open for the Zenith carburetor and 2-1/4 turns for the Marvel-Schebler carburetor.

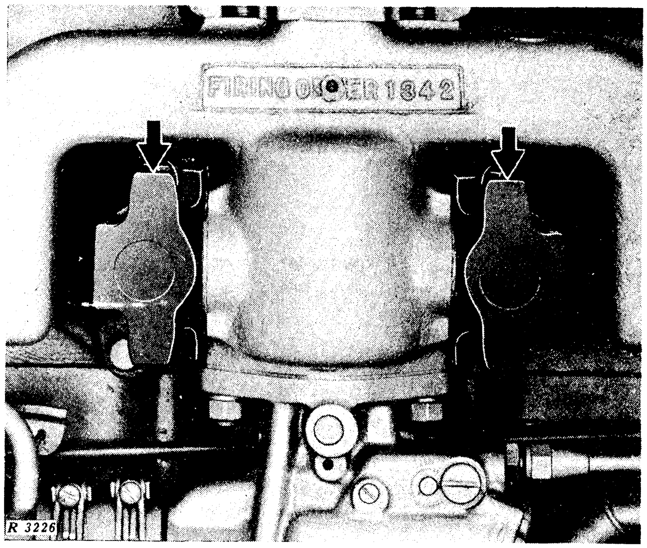
MANIFOLD

The flow of exhaust gases through the gasoline manifold can be controlled to regulate the temperature of the incoming air-fuel mixture. Adjustment is made by turning the heat valve blocks shown below. Set the heat valve blocks "HOT" when average air temperature during tractor operation is below 32°F.



Heat Valve Blocks Set "COLD"

When icing conditions exist, set the valve blocks "HOT" when average air temperature is below 40°F.



Heat Valve Blocks Set "HOT"

LP-GAS FUEL SYSTEM

DESCRIPTION

The LP-Gas fuel system consists of the fuel tank with its valves, fuel-lock strainer, converter, carburetor, and connecting lines.

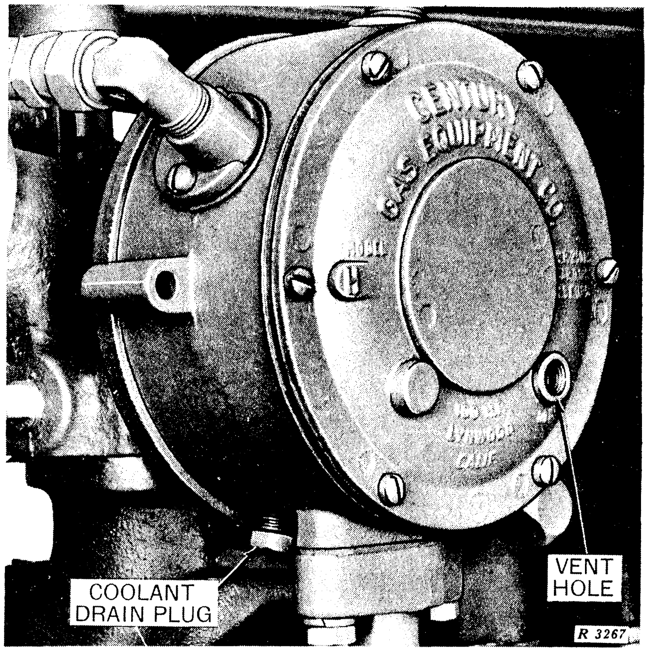
Fuel-Lock Strainer

The fuel-lock strainer removes particles of dirt or other foreign matter from the fuel after it leaves the tank. An electrically operated shut-off valve is built into the strainer as an additional safety factor. The shut-off valve is open only when the key switch is turned to the "ON" position.

Converter

Liquid fuel from the fuel-lock strainer enters the converter which changes it into a gas and reduces the pressure until it is correct for use in the engine.

Since heat is absorbed by the fuel as it vaporizes, warm coolant from the engine flows through the converter to replace heat absorbed by the gas and to prevent freezing of possible moisture in the fuel. To maintain efficient converter operation, it is important to use only clean soft water with a rust inhibitor or anti-freeze solution.



LP-Gas Converter

If the tractor cooling system is drained to prevent freezing, be sure to remove the drain plug and drain the coolant trapped in the converter.

CAUTION: Do not attempt to repair or adjust the converter. Service work should be performed only by qualified servicemen. See your John Deere dealer.

Carburetor

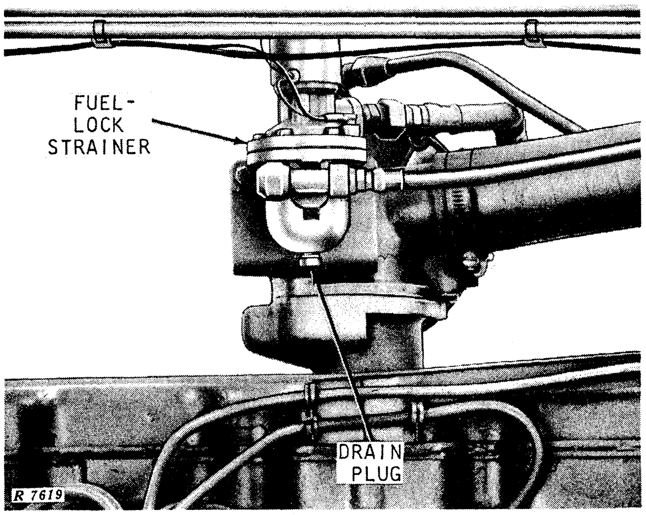
Vaporized fuel is drawn from the converter into the carburetor where the fuel is thoroughly mixed with air in the proper ratio to create a combustible mixture.

INSPECTION AND CLEANING

Proper inspection and cleaning of the fuel system is important to the operation of your tractor.

Periodically check the valves and connections for leaks by using a soap and water solution. The fuel system is designed and manufactured with the best procedures and is approved by Underwriters' Laboratories, but a tractor is subject to service conditions which might cause a leak to develop.

Fuel-Lock Strainer

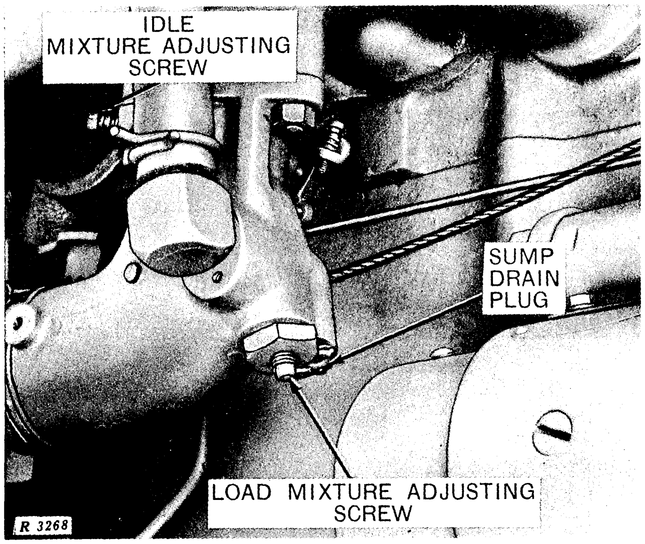


Fuel-Lock Strainer

After every 600 hours or whenever frost accumulates on the strainer during tractor operation, drain the fuel-lock strainer sediment bowl.

Be sure both vapor and liquid withdrawal valves are closed, the key switch is turned off, and the engine is cold before removing the plug. After all possible sources of fire have been eliminated, remove the plug from the bottom of the strainer. Open the liquid withdrawal valve slightly so that pressure from the fuel tank will blow out accumulations of dirt. Close the liquid withdrawal valve and install the drain plug. Use soapy water to test the drain plug for leaks.

Carburetor Sump



LP-Gas Carburetor

After every 200 hours of operation, or whenever deemed necessary, remove the carburetor sump drain plug and drain the sump of any foreign material (usually an oily substance). Be sure both vapor and liquid withdrawal valves are closed, key switch is off, and the engine is cold before removing the drain plug.

IDLE MIXTURE ADJUSTMENT

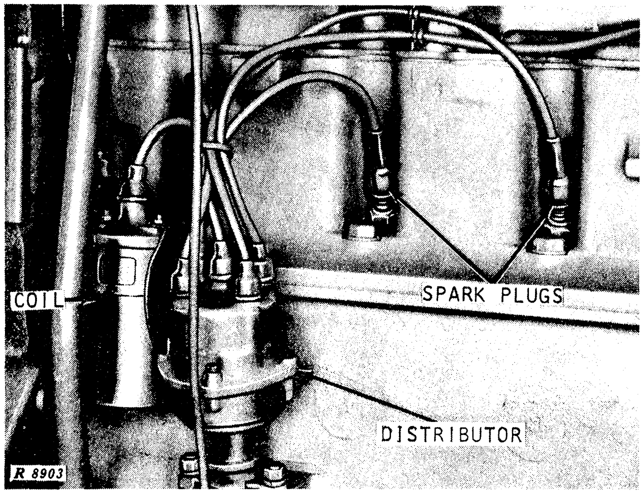
With the engine running at operating temperature place the hand throttle in the 500 rpm idle position (pull out knob and push throttle up against the stop).

Turn the idle mixture adjusting screw to give maximum engine speed. An average idle mixture adjusting screw setting is one turn open.

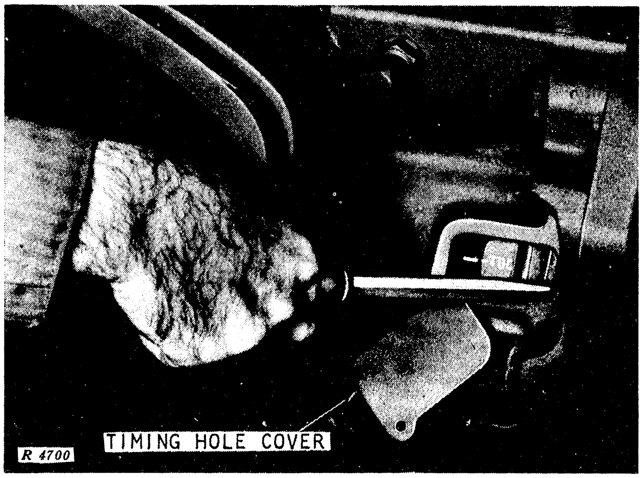
LOAD MIXTURE ADJUSTMENT

The carburetor is equipped with a load mixture adjusting screw. Normally it is not necessary to change the setting of this screw. However, if the tractor is operated in very hot weather or at high altitude, performance may be improved by closing the screw one or two turns. An average load mixture adjusting screw setting is 5-1/2 turns open. FOR EFFICIENT OPERATION, have your John Deere dealer make this setting.

IGNITION SYSTEM (Gasoline and LP-Gas Tractors)



Ignition System Components



Turning Flywheel

DESCRIPTION

The ignition system consists of a battery, key switch with resistor, coil, distributor, spark plugs, and the connecting wiring.

The ignition system must function efficiently to obtain maximum operating efficiency from the tractor. Check the distributor and spark plugs at the end of every 600 hours of operation or whenever necessary.

DISTRIBUTOR

If you are experiencing ignition trouble, remove the small wire that leads to the distributor from the front coil terminal. Turn on the key switch and momentarily ground the front coil terminal. If no spark occurs, the trouble is in the battery-to-distributor circuit. If a spark does occur, connect the wire to the terminal and check the spark plugs and spark plug cables. If these are in good condition, remove the distributor cap, rotor, and dust cover. Clean the parts with a rag. Inspect the parts carefully and replace those that are cracked or are otherwise defective.

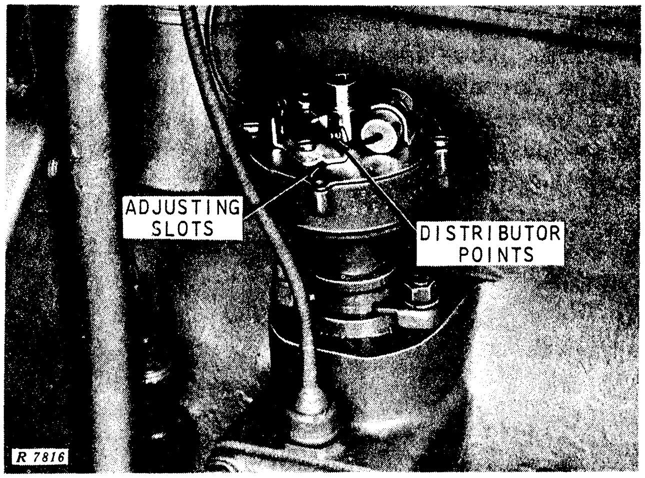
Servicing Distributor Points

If the points are badly pitted or worn, replace them with genuine John Deere parts. If the points have a frosty gray appearance with only a very slight amount of pitting, it is not necessary to disturb them. For emergency reconditioning of points, remove them and hone each surface smooth and flat. It is not necessary to remove pits. Install the points and examine them for free movement. Bend the grounded point to align the point surfaces. Open the timing hole cover located on the right-hand side of the clutch housing. Turn the flywheel until the points open to the widest position. Adjust the points to 0.022-inch clearance.

Since foreign particles cause rapid point wear, clean the contact surfaces with a few drops of lighter fluid on a strip of lint-free cloth. Then pull a dry strip through the points to remove the residue. OBSERVE CAUTION when using lighter fluid. Wipe the cam and lubricate it with a trace of cam lubricant.

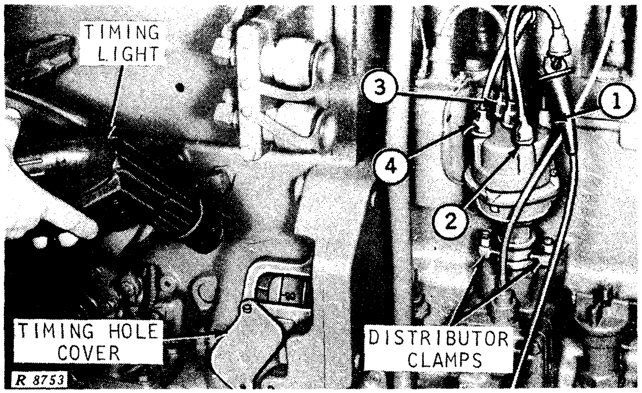
Install the dust cover, distributor rotor, and distributor cap.

To obtain the best tractor performance possible, time the distributor with a timing light each time the points are serviced.



Distributor Points

Timing Distributor



Timing Distributor with Timing Light

Connect a timing light according to the manufacturer's instructions to the No. 1 (front) spark plug cable. (If a timing light is not available, your John Deere dealer can perform this service.)

Run the engine at the rpm specified in the chart below. Open the timing hole cover located on the right-hand side of the clutch housing. Loosen the distributor clamps and rotate the distributor until the degree mark specified in the following chart lines up with the reference mark on the timing hole. When distributor timing is correct, tighten the distributor clamps and close the timing hole cover.

DISTRIBUTOR TIMING

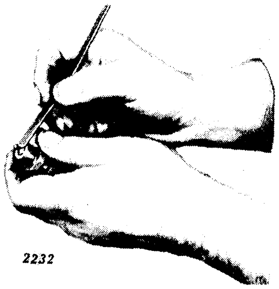
Engine	Run Engine at	Distributor Advance
Gasoline	2200	20° BTDC
LP-Gas	2100	25° BTDC

SPARK PLUGS

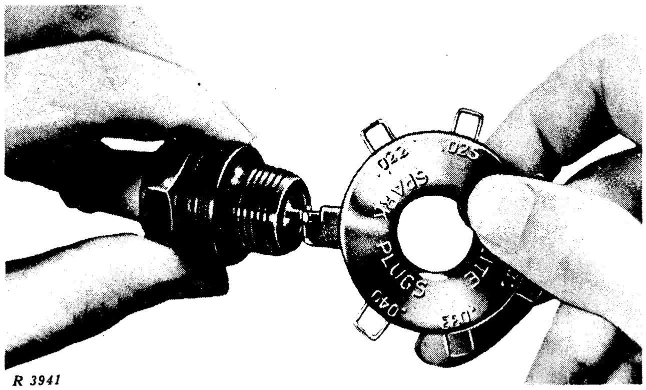
Remove the dirt from around the spark plugs. If compressed air is used, protect your eyes from flying particles. Remove the spark plugs.

If the plugs are dirty, scrape or clean them. If the porcelain is cracked or if the electrodes are badly eroded, install new plugs of correct size and heat range obtained from your John Deere dealer.

If plugs are still serviceable, use a fine-cut point file to file the electrode surfaces flat and square.



Filing Electrodes



Setting Spark Plug Point Gap

Use a wire spark plug gauge to set the spark gap to 0.025 inch for gasoline tractors and to 0.015 inch for LP-Gas tractors. Bend the grounded (outer) electrode only.

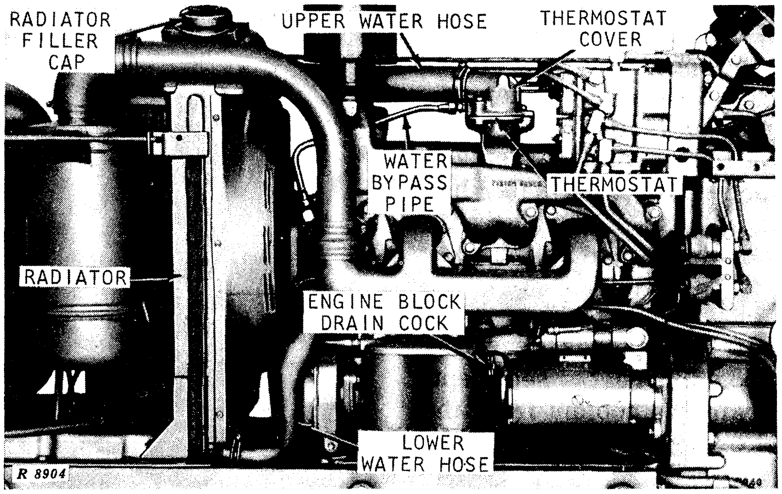
Use new gaskets when installing spark plugs. Tighten spark plugs to between 32 and 38 ft-lbs torque.

SPARK PLUG CABLES

Keep cables clean to prevent shorting. Under certain weather conditions, cables may eventually become hard and cracked and require replacement. The cable terminals should fit snugly in the socket of the distributor cap. Be sure each cable is securely fastened to the spark plug terminal.

If these operations do not correct the ignition troubles, see your John Deere dealer.

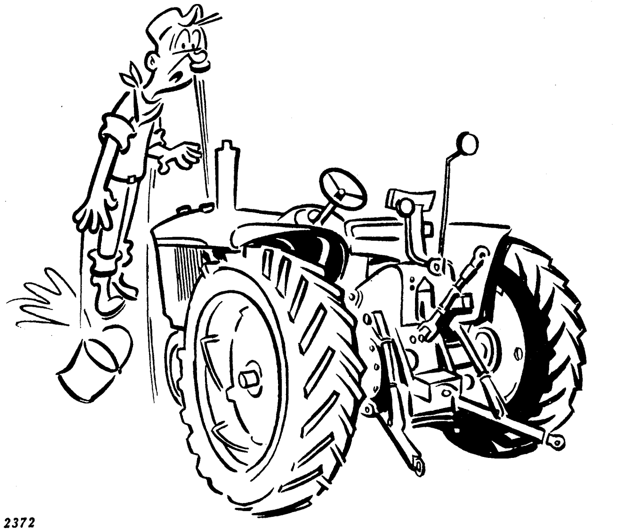
COOLING SYSTEM


RADIATOR FILLER CAP
UPPER WATER HOSE
THERMOSTAT COVER
WATER BYPASS PIPE
THERMOSTAT
RADIATOR
ENGINE BLOCK DRAIN COCK
LOWER WATER HOSE
R 8904

Cooling System Components

DESCRIPTION

The cooling system consists of the radiator, radiator filler cap, thermostat cover, thermostat, water bypass line, upper and lower water hoses, and coolant passages within the cylinder head and block.



R 2372

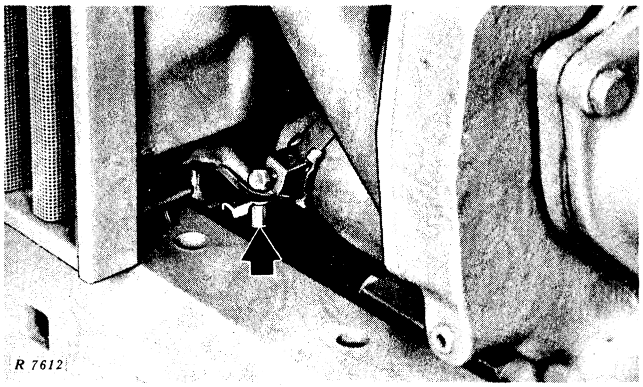
CAUTION: Remove the radiator filler cap only when the coolant temperature is below the boiling point (in the "N" range on the water temperature gauge). Then loosen the cap slightly to the stop to relieve pressure before removing the cap completely.

Because the cooling system is pressurized, all of its components must be tight and in good condition before the system can operate properly. Unless pressure is maintained, overheating and loss of coolant will result.

The pressure valve in the radiator filler cap is set to release when the pressure in the cooling system is from 6-1/4 to 7-1/2 pounds. Capacity of the cooling system is 19 U.S. quarts.

CLEANING COOLING SYSTEM

For efficient operation, the cooling system should be drained, flushed, and filled before and after the winter season.



Radiator Drain Cock

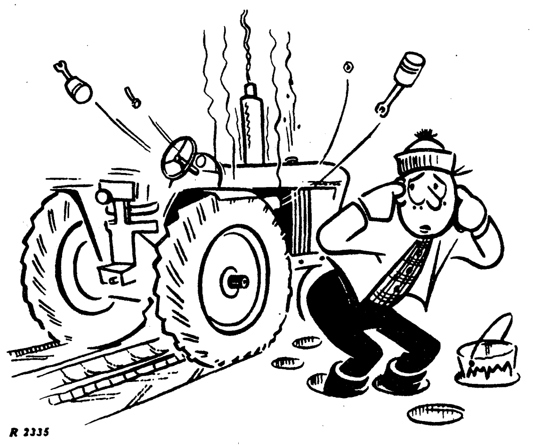
To perform this service, drain the system by opening the drains on the engine block and radiator. Remove the hood (page 57) and disconnect the water bypass pipe and upper water hose from the thermostat cover. Then remove the thermostat cover retaining cap screws, lift the cover off the tractor, and remove the thermostat. Replace the thermostat cover and connect the water bypass pipe and upper water hose. Close the radiator and the engine block drains and fill the system.

Run the engine until it reaches operating temperature to stir up possible rust or sediment. Stop the engine and drain the coolant from the system before the rust or sediment settles.

Close the drains. Fill the cooling system with a solution composed of a good commercial radiator cleaner and water. Follow the instructions with the cleaner.

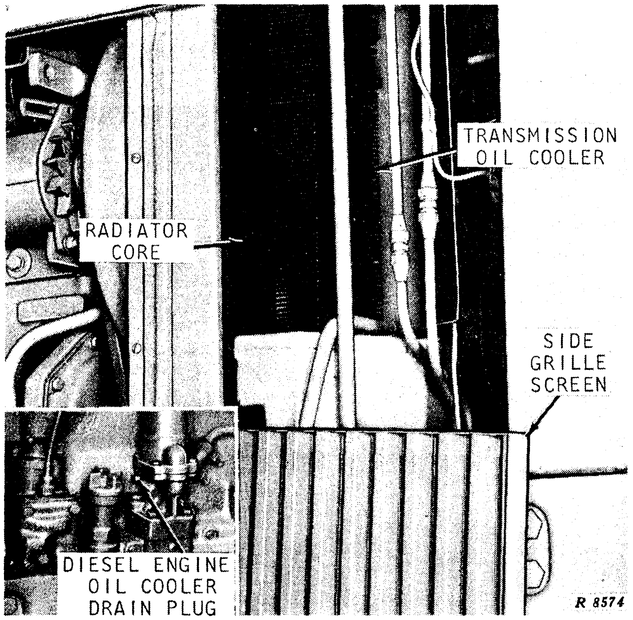
After cleaning the cooling system, fill it with water to flush the system. Install the filler cap and run the engine until it reaches operating temperature. Then drain out this flushing water.

Remove the thermostat cover and replace the thermostat. Replace the cover and connect the water bypass pipe and upper water hose. Then, close the drains and fill the system with clean, soft water and a rust inhibitor (or antifreeze solution) to 1-1/4 inches below the bottom of the filler neck. Well water often contains lime and other minerals which eventually may clog the radiator core and reduce the cooling efficiency.



CAUTION: Never pour hot water into a cold engine or cold water into a hot engine. You may crack the head or the cylinder block. Do not operate the tractor without water for even a few minutes.

CLEANING SIDE GRILLE SCREENS, RADIATOR CORE, AND OIL COOLER



Side Grille Screen, Radiator Core, and Oil Cooler

Release the side grille screens and examine all air passages in the radiator core. Remove all chaff and dirt from the radiator and transmission oil cooler and straighten bent fins. Remove all chaff and dirt from the screens and replace them.

PREPARING FOR COLD WEATHER

Prior to cold weather, be sure to drain and flush the cooling system. Fill the system with a recognized brand of antifreeze solution to eliminate the need for daily filling and draining of the cooling system.

Antifreeze

Use only ethylene glycol (permanent type) antifreeze which contains a rust inhibitor.

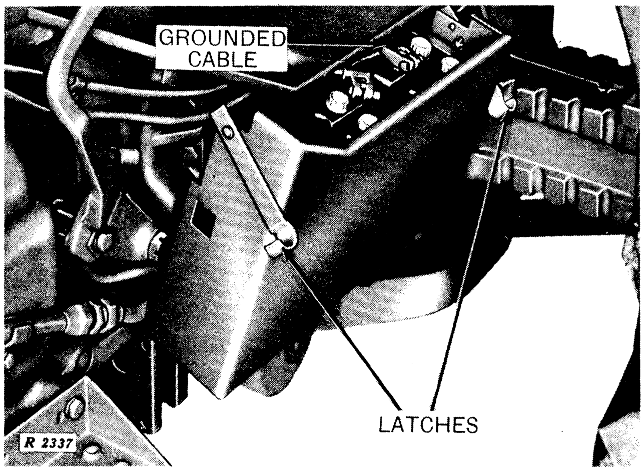
After adding the antifreeze solution, run the engine until it reaches operating temperature to allow the thermostat to open. This will make sure that the solution is circulated throughout the entire cooling system.

Draining

If the cooling system on an LP-Gas tractor is drained to prevent freezing, be sure to drain the converter. On diesel tractors, be sure to drain the engine oil cooler (located to the rear of the generator).

ELECTRICAL SYSTEM

BATTERIES



Battery Compartment Tilted Outward

On diesel tractors, two 12-volt storage batteries connected in series furnish 24 volts for the starter and 12 volts for the lights and other electrical equipment. The battery compartments are below the platform on each side of the tractor.

Gasoline or LP-Gas tractors have one storage battery located under the platform on the left-hand side. To gain access to a battery, pull out and up on the latches at the front and rear of the compartment to tilt it outward.

When replacing a battery, use only a 12-volt, 78-plate battery with a minimum rating of 75 ampere-hours. The battery is 19-5/16 inches long, 4-11/32 inches wide, and 9-3/4 inches high. On diesel tractors, be sure that both batteries have the same ampere-hour rating.

The original tractor batteries are guaranteed for 90 days against defects in workmanship and material. You can also register your batteries and obtain protection for an additional period of time. See your battery dealer.

Dangers Connected with Batteries

Keep all sparks or open flames away from the batteries as the gas from the electrolyte is highly flammable. Batteries will cause severe damage or burns if some parts of the electrical system are grounded or short-circuited. To avoid injury or damage when servicing the electrical system, disconnect the battery ground straps.

Checking Electrolyte Level

Check the level of the electrolyte (acid and water solution) in the batteries at least every 200 hours of operation. Fill the battery cells to the bottom of the filler neck. Use distilled water. If distilled water is not available, use any clean water that is fit to drink and does not have a high mineral content.

CAUTION: Since water and electrolyte will not mix immediately, do not add water in freezing weather unless the engine is to be run long enough (2 or 3 hours) to assure a thorough mixing of water and electrolyte.

Checking Specific Gravity

Use a battery hydrometer to check the specific gravity of the electrolyte in each battery cell. Hold the hydrometer vertical and take the reading. Correct the reading by adding four gravity points (0.004) for every ten degrees the electrolyte temperature is above 80°F. or subtracting four gravity points for every ten degrees below 80°F. A fully charged battery will have a corrected specific gravity of 1.260. Charge the battery if the reading is below 1.215.

Cleaning Batteries

Keep the batteries clean by wiping them off with a damp cloth at the end of every 200 hours of operation or whenever dirt appears excessive.

If corrosion is present around the terminal connections, remove it and wash the terminals with an ammonia solution or a solution consisting of 1/4-pound of baking soda added to one quart of water. Be sure the vent plugs are tight to prevent cleaning solution from entering the cells.

After cleaning, flush the outside of the battery, the battery compartment, and surrounding areas of the tractor with clear water. Examine the vent holes in each battery cap to make sure they are open.

Cold Weather Battery Service

During cold weather, it is particularly important to keep the electrolyte in the batteries at the proper level, and to keep the batteries fully charged. Otherwise the batteries are apt to freeze.

Freezing weather will have little damaging effect on a fully charged, properly filled battery.

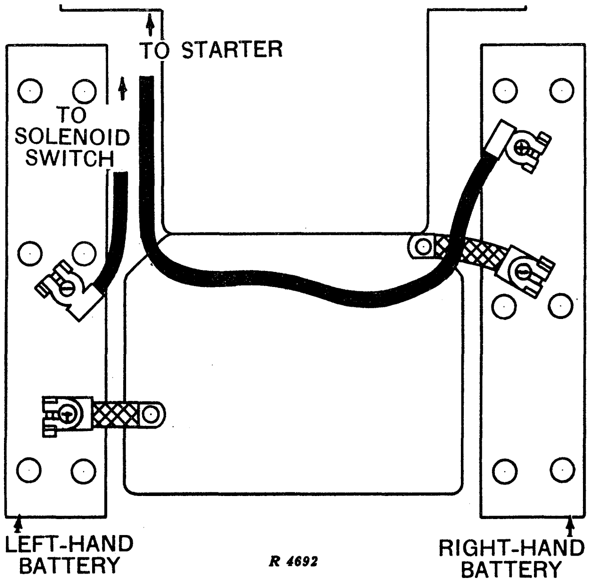
Removing and Installing Batteries

Disconnect the battery ground strap and the insulated battery cable. Remove the battery hold-down clamp and the battery.

When installing the battery, center it in the compartment. Tighten the battery hold-down clamp. Overtightening the clamp may damage the battery.

Connecting Batteries

Before attaching the battery cables and ground straps, make sure that the terminals on the battery are thoroughly clean. Dirt and corrosion between the terminals and connectors create high electrical resistance and permit arcing which quickly burns and pits the terminals and connectors.



Diesel Battery Connections

Connect the cables and ground straps as shown. On gasoline or LP-Gas tractors, connect the battery as shown for the left-hand battery. Be sure to connect the cable or strap marked "N" to a negative (-) battery terminal and the cable or strap marked "P" to a positive (+) battery terminal.

Tighten the clamps securely. Coat the terminals and connectors with vaseline mixed with baking soda to retard corrosion.

Storing Batteries

If the tractor is to be stored for more than 30 days, or for the winter season, remove the batteries and store them in a cool, dry place not subject to freezing temperatures. Check the batteries in storage every 30 days and charge them if necessary.

Balancing Battery Loads (Diesel Tractors)

On diesel tractors, approximately half of the electrical load is placed on each battery except when accessories used with the electrical outlet socket draw excessive amperage.

Electrical equipment which draws up to 7 or 8 amperes may be used for short periods of time. However, if accessories drawing more than 3 amperes are plugged into the socket for an extended period of time, the left-hand battery will become discharged before the right-hand battery. (Batteries are out of balance.) If necessary, have your John Deere dealer connect a second outlet socket to the right-hand battery. Then divide the load between the sockets. When the above step is taken, check the state of charge of the batteries at frequent intervals.

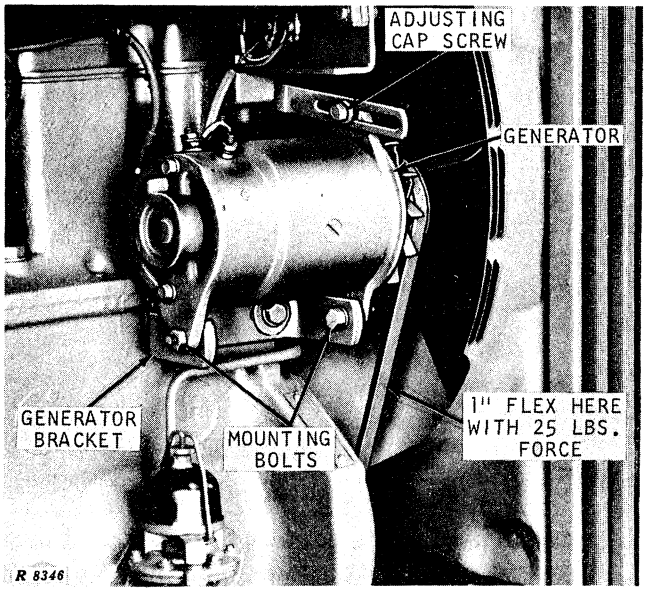
GENERATOR AND REGULATOR

The generator, located at the right-hand front side of the engine, provides electric current for charging the batteries and for the other electrical requirements of the tractor. The three-unit regulator consisting of a cutout relay, voltage regulator, and current regulator, regulates the voltage and current output of the generator. The regulator is located above the generator.

Adjusting Generator Belt Tension

After every 200 hours of operation or whenever necessary, check the generator belt tension.

With the mounting bolts and adjusting cap screw loose, force the generator away from the

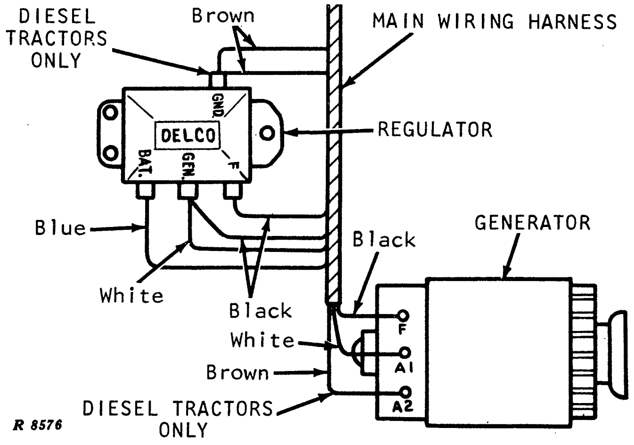


Generator Belt Adjustment

engine until a firm push (25-pound force) midway between the two pulleys will depress the generator belt 1 inch. Hold the generator in this position and tighten the adjusting and mounting bolts.

Generator-Regulator Connections

If for any reason the generator and regulator wires are disconnected, connect them as shown in the illustration.

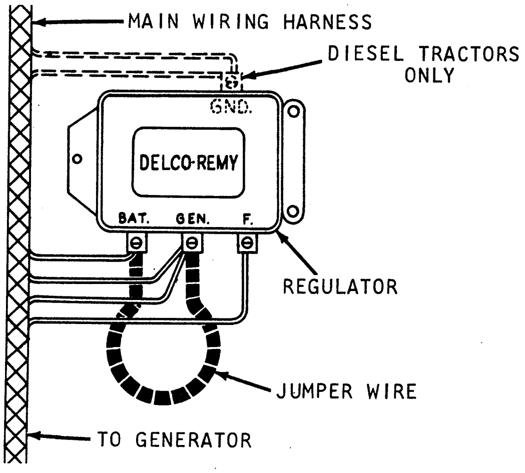

DIESEL TRACTORS ONLY
Brown
MAIN WIRING HARNESS
GND.
DELCO
BAT.
GEN.
F
REGULATOR
Blue
White
Black
Black
GENERATOR
White
Brown
DIESEL TRACTORS ONLY
F
A1
A2

R 8576

Generator and Regulator Connections

Polarizing the Generator

After connecting the generator, regulator, starter, or battery, be sure to polarize the generator before starting the engine. Failure to polarize the generator can result in burned-out regulator points, a burned-out generator or a run-down battery. To establish correct polarity, momentarily touch a jumper wire to the regulator "BAT" and "GEN" terminals.


MAIN WIRING HARNESS
DIESEL TRACTORS ONLY
GND.
DELCO-REMY
BAT.
GEN.
F.
REGULATOR
JUMPER WIRE
TO GENERATOR

R 8635

Jumper Wire Used to Polarize Generator

STARTER

The engine is cranked by a heavy-duty starter, located on the left-hand side of the engine. It is built to carry a big load for a short period of time. A solenoid switch on top of the starter makes the electrical connection between the starter and the batteries.

CAUTION: Never hold the key switch in the start position for more than 30 seconds at a time. After 30 seconds, allow at least two minutes for the starter to cool. After a false start, be sure that the starter has stopped completely before attempting another start.

If the starter responds normally, it can usually be considered to be in good condition. However, periodic checking of the starter and its connections may be necessary.

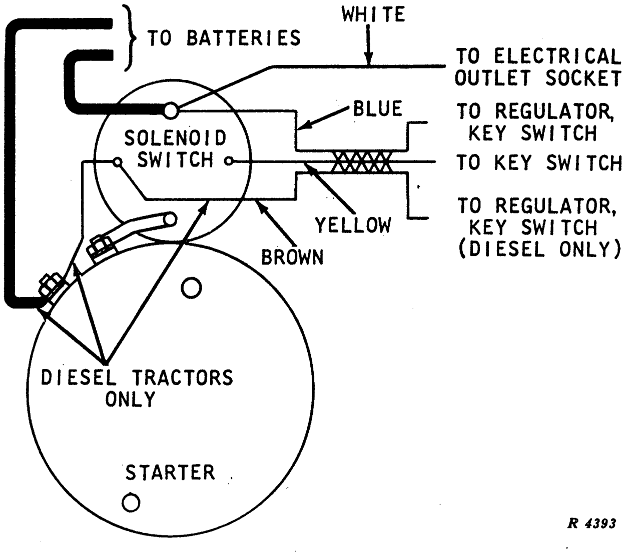
Checking Causes of Sluggish Starter

The usual causes of a sluggish starter (other than the starter) are run-down batteries, loose connections, defective wiring, or some condition in the engine that puts a heavier load on the starter. Check the batteries (page 67) and the condition of the wiring. The wiring connections should be clean and tight. At low temperatures, be sure the engine crankcase oil is of the correct viscosity and quality (page 45).

See your John Deere dealer if these checks fail to improve starter performance.

Starter-Solenoid Switch Connections

If the starter and solenoid switch wires and cables are disconnected for any reason, connect them as shown in the illustration and polarize the generator.

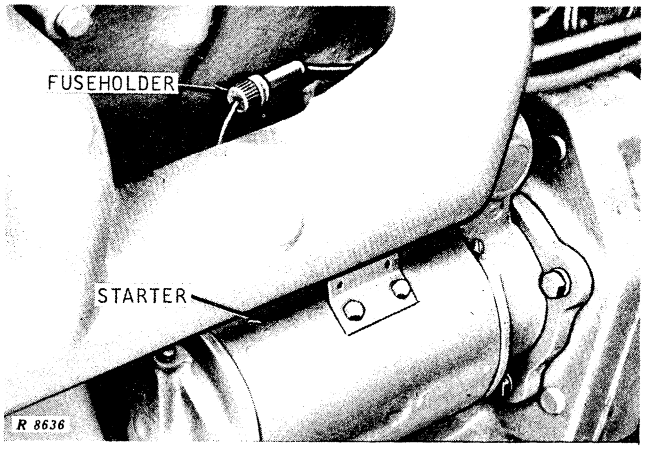

TO BATTERIES
WHITE
TO ELECTRICAL OUTLET SOCKET
BLUE
TO REGULATOR, KEY SWITCH
SOLENOID SWITCH
TO KEY SWITCH
YELLOW
TO REGULATOR, KEY SWITCH (DIESEL ONLY)
BROWN
DIESEL TRACTORS ONLY
STARTER

R 4393

Starter and Solenoid Connections

FUSE AND CIRCUIT BREAKERS

Fuse



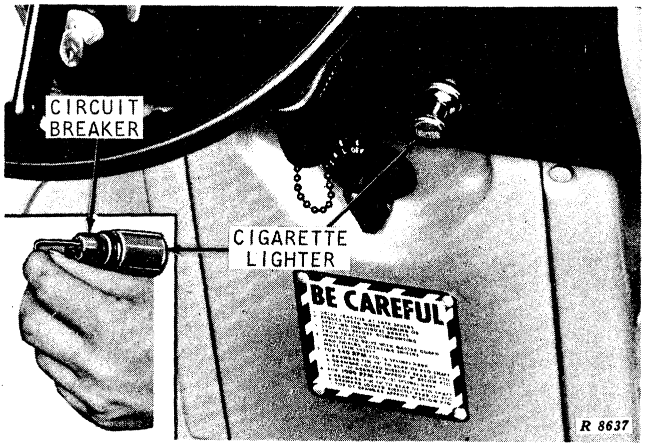
Fuseholder in Electrical Outlet Socket Wiring

The electrical outlet wiring is protected by an SFE 20-ampere fuse mounted in a fuseholder above the starter. To replace the fuse, remove the left-hand side shield, unscrew the fuseholder and install a new fuse. Install side shield.

Circuit Breakers

The wiring circuits for the lights and cigarette lighter are protected by separate 12-volt circuit breakers. If the lighting or cigarette lighter circuit becomes overloaded, a circuit breaker will open, preventing the lights or lighter from operating.

If the lights go out while the light switch is on, turn the light switch off and wait for 1 minute before turning the switch back on. The circuit breaker will reset itself. See your John Deere dealer if the lights fail to operate properly.



Cigarette Lighter Circuit Breaker

If the cigarette lighter fails to operate, the circuit breaker for its circuit may be open and must be reset before the lighter will operate. Remove the dash panel. Then insert a wire in the small hole at the rear of the lighter to reset the circuit breaker. If the lighter fails to operate after resetting the circuit breaker, or if the lighter fails intermittently, see your John Deere dealer.

LIGHTS

Sealed-Beam Lamps

The tractor may be equipped with either two or four sealed-beam headlights. On fenders with dual headlights, the inner lamps are sealed-beam head lamps and the outer ones are sealed-beam flood lamps. The tractor also has a combination rear lamp which consists of a sealed-beam unit to provide a bright flood light and a single-contact bulb which glows through the sealed-beam unit to provide a red taillight.

When replacing the red taillight, replace the bulb mounted on the inside of the taillight instead of the sealed-beam unit. Replace burned out or broken sealed-beam units according to the following specifications:

Tractor	Lamps	Mounting	Volts	Part No.
Row-Crop	Inner head (2)	Fender	12	AF 3892R
	Outer flood (2)	Fender	12	AR21059R
Row-Crop	Head (2)	Hood	12	AF 3892R
Standard	Head (2)	Hood or fender	12	AF 3892R
All	Taillight (1)*	Rear	12	AR21737R

**Also includes bulb which provides red light.*

Bulbs

The tractor is equipped with bulbs in the generator and oil pressure indicator lamps on the instrument panel, dash lamp, taillight, and optional tractor and implement warning lamps.

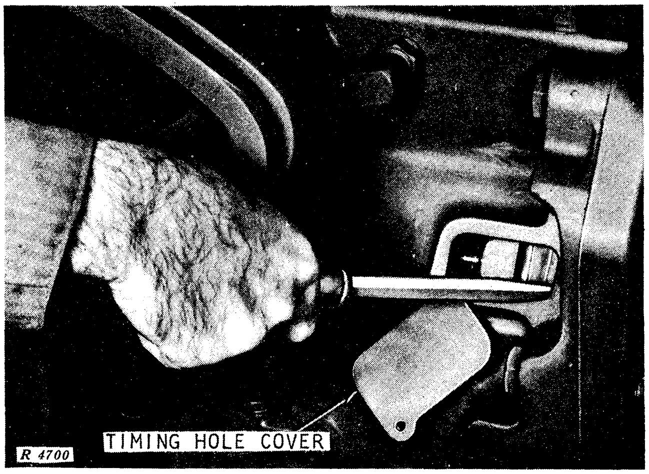
Replace burned out or broken bulbs according to the following specifications.

Location	Contact	Color	Candle-Power	Part No.
Ind. lamps	Single	Red	2	R 30379R
Dash lamp	Single	White	6	AT12948T
Taillight	Single	White	15	AR21739R
Warning lamps	Single	White	21	AA 6218R

VALVE CLEARANCE

The valve clearance should be checked and adjusted, if necessary, after every 600 hours of operation.

To check and adjust valve clearance (with either a hot or cold engine), remove the hood (page 57), crankcase breather pipe, and valve rocker arm cover.



Turning Flywheel to "TDC" Mark

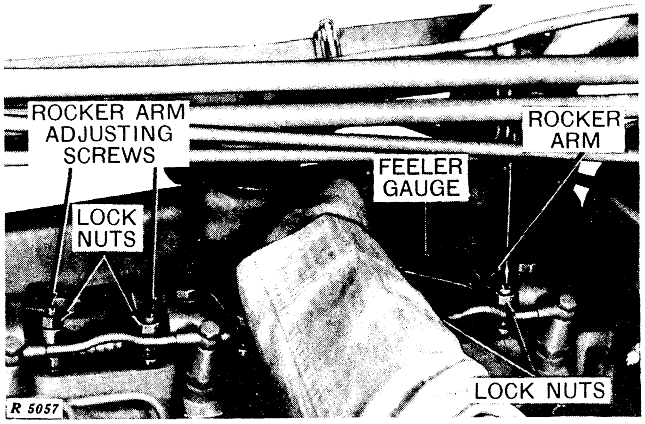
Open the timing hole cover on the right-hand side of the flywheel housing. Turn the engine over in the running direction (counter-clockwise when viewed from the rear of the tractor) until No. 1 (front) intake valve closes. The engine is now on the compression stroke. Continue turning the flywheel until "TDC" on the flywheel lines up with the reference mark at the rear of the timing hole.

Use a feeler gauge to check the valve clearance for the No. 1 (front) cylinder. If the clearance for both the intake and exhaust valves is not as specified in chart below, loosen the lock nuts on the adjusting screws and turn the adjusting screws in or out to give proper clearance. Tighten the lock nuts and check to be sure that the clearance is correct.

VALVE CLEARANCE

Engine	Intake Valves	Exhaust Valves
Diesel	0.018 in.	0.018 in.
Gasoline	0.015 in.	0.028 in.
LP-Gas	0.015 in.	0.028 in.

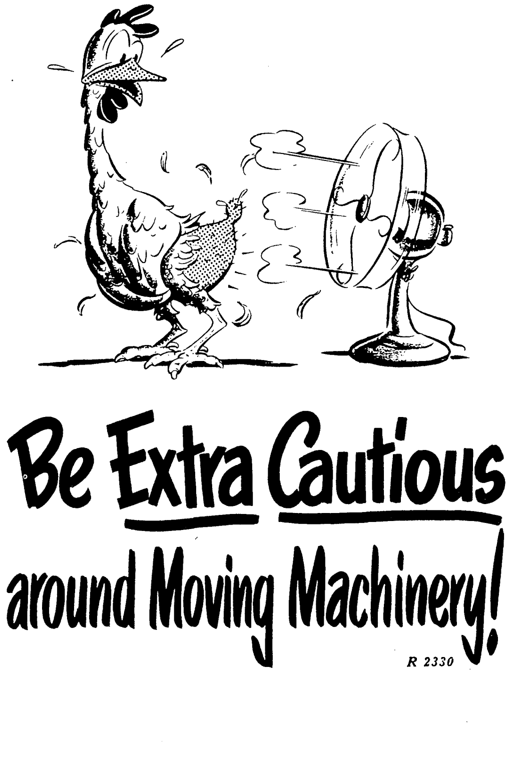
NOTE: On diesel and gasoline tractors, the exhaust valve spring caps (rotators) appear to be heavier than the intake valve spring caps.



Adjusting Valve Clearance for No. 1 Cylinder

Rotate the flywheel counter-clockwise 180 degrees, lining up the "180" mark on the flywheel with the reference mark at the timing hole. Then check and adjust the valve clearance for the No. 3 cylinder in the same manner as the No. 1 cylinder. Rotate the flywheel counter-clockwise 180 degrees, lining up the "TDC" mark on the flywheel with the reference mark at the timing hole. Then check and adjust the valve clearance for the No. 4 cylinder. Check and adjust the valve clearance for the remaining cylinder in the above manner in firing order sequence. Firing order is 1-3-4-2.

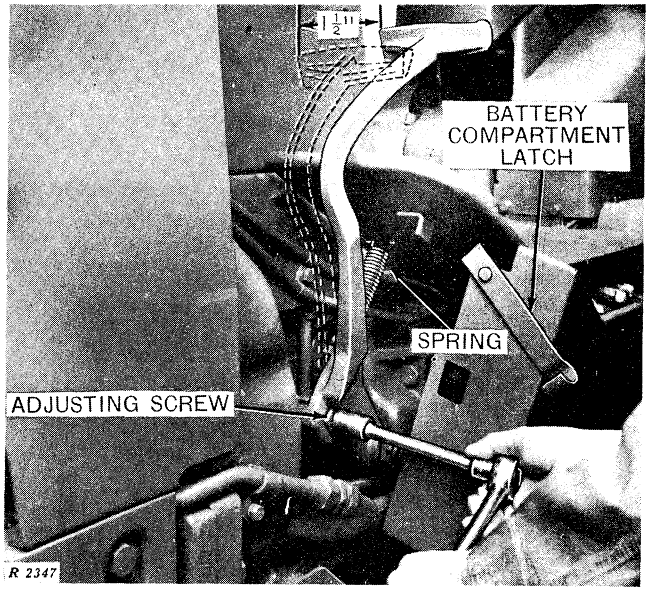
After the valve clearance for all four cylinders is correct, close the timing hole cover and replace the valve rocker arm cover, crankcase breather pipe, and hood.



TRANSMISSION CLUTCH
(Syncro-Range Tractors)

The clutch pedal on Syncro-Range tractors should be checked and adjusted if necessary every 200 hours of operation or whenever free travel is less than 3/4-inch.

CAUTION: Do not operate the tractor when clutch pedal free travel is less than 3/8-inch.



Clutch Pedal Free Travel Adjustment

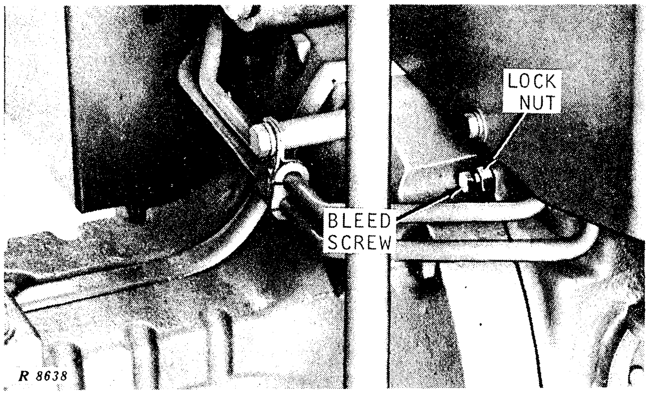
With the transmission in "PARK" and the engine running at 1900 rpm, measure the distance the clutch pedal travels before it begins to disengage the clutch. The clutch pedal free travel should be 1-1/2 inches.

If the free travel is less than 3/4-inch, tilt the battery compartment outward, remove the cotter pin, and loosen the large slotted nut. Loosen the clutch pedal adjusting screw. With the transmission in "PARK" and the engine running at 1900 rpm, adjust the pedal free travel to 1-1/2 inches. Tighten the adjusting screw and the large slotted nut. Recheck the free travel to be sure it is correct. Install a new cotter pin in the large slotted nut and close the battery compartment.

BE CAREFUL
TAKE YOUR TIME—NOT YOUR LIFE

POWER BRAKES

The power brakes should be bled after every 200 hours of operation, or whenever brake pedal travel exceeds 5-3/4 inches on the second application after the engine is stopped.



Brake Bleed Screw and Lock Nut

To bleed the brakes, start the engine and loosen the bleed screw lock nuts on both sides of the tractor at the rear axle housing. Turn each bleed screw out two turns and tighten the lock nut. Tightening the lock nut prevents oil from leaking around the bleed screw.

Depress the brake pedals for 2 minutes to bleed air from the brake system. While holding the pedals down, loosen the bleed screw lock nuts and tighten the bleed screws. Tighten the lock nuts, release the pedals, and stop the engine.

Depress each pedal. Solid pedal feel should be obtained on the next application and brake pedal travel should not exceed 5-3/4 inches. If travel is excessive, repeat the bleeding procedure. If bleeding the brakes does not correct the difficulty, consult your John Deere dealer.

TIRES

Check the tires for air inflation (page 20) every 200 hours of operation, or whenever necessary, and inspect them for possible cuts or breaks that may expose the tire fabric. To prevent further damage, repair the cuts or breaks.

Protect the tires from exposure to oil, grease, fuel, bright sunlight, and chemicals (including those used for dusting and spraying). Careless driving over sharp objects shortens tire life.

FRONT WHEEL BEARINGS

The front wheels of your tractor are carried on roller bearings. Check the front wheels periodically for bearing end play. Clean and pack the front wheel bearings at the end of every 1200 hours of operation, or after the tractor has been operated in extremely wet and muddy conditions.

DOUBLE FRONT WHEEL, ROLL-O-MATIC, OR WIDE FRONT AXLE

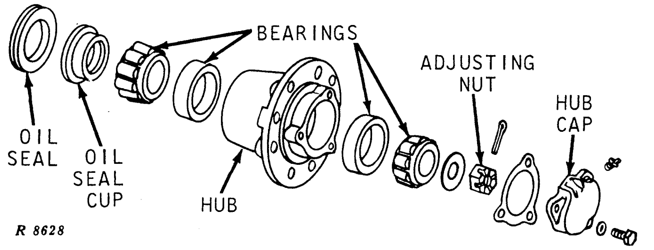
Adjusting Bearings

To adjust the bearings on one of these types of front ends, remove the hub cap and cotter pin. Draw the adjusting nut up until a slight drag is felt when the wheel is rotated. If the adjusting nut has to be turned three or four castellations, remove the wheel and inspect the bearings.

After the adjusting nut is drawn tight, back it off to insert the cotter pin in the first hole. If one hole is aligned with a slot when the nut is tightened, back the nut off to align the second hole with the nearest slot. Both front wheels must be adjusted in the same manner.

Cleaning and Packing Bearings

Disassemble and clean all parts of the hub and spindle. Inspect the bearings and replace them if they are worn. If three deep grooves are worn in the seal cup, have the oil seal and oil seal cup replaced.


BEARINGS
ADJUSTING NUT
HUB CAP
OIL SEAL
OIL SEAL CUP
HUB
R 8628

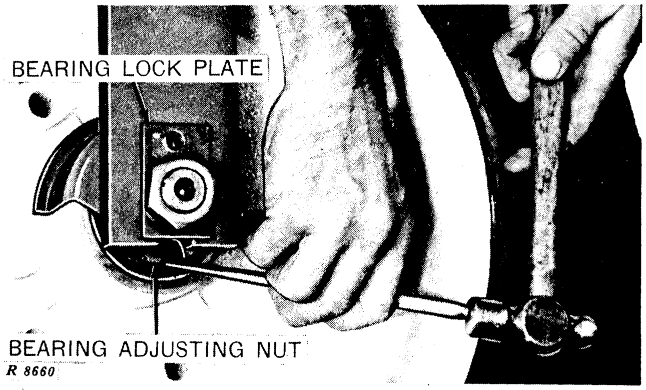
Front Wheel Bearings (Double Front Wheel, Roll-O-Matic, or Wide Front Axle)

Pack the bearings with wheel bearing grease. Pack the oil seal lips with SAE multipurpose-type grease. Install the wheels and adjust the front wheel bearings.

SINGLE FRONT WHEEL

Adjusting Bearings

Back off the bearing lock plate screw and the axle nut. Then tighten the bearing adjusting nut until a slight drag is felt when the wheel is rotated. Back the nut off and lock the adjustment in the closest notch with the lock plate screw. Tighten the axle nut. The wheel should still rotate with a slight drag. If adjustment is correct, bend corner of lock plate against axle nut.

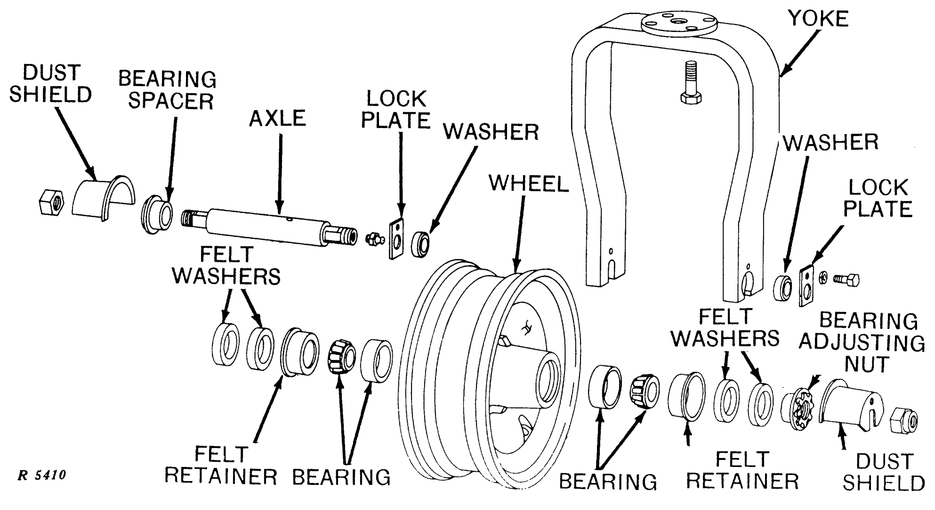

BEARING LOCK PLATE
BEARING ADJUSTING NUT
R 8660

Adjusting Single Front Wheel Bearing

Cleaning and Packing Bearings

Disassemble and clean all parts of the hub and spindle. Inspect the bearings and felt washers and replace them if they are worn. Use new felt washers when installing new bearings.

Pack the bearings with wheel bearing grease. Assemble the wheel and install it on the tractor. Adjust the front wheel bearings.


YOKE
DUST SHIELD
BEARING SPACER
AXLE
LOCK PLATE
WASHER
WHEEL
WASHER
LOCK PLATE
FELT WASHERS
FELT WASHERS
BEARING ADJUSTING NUT
FELT RETAINER
BEARING
BEARING
FELT RETAINER
DUST SHIELD
R 5410

Single Front Wheel

TRACTOR STORAGE

If your tractor is to be put in storage for several months, the suggestions for storing it and removing it from storage on this page will help to prevent excessive deterioration.

STORING THE TRACTOR

With the engine warm, drain the engine crankcase, replace the crankcase filter element, and fill the crankcase with new oil of the proper weight and quality (page 45). Service the air cleaner, oil cup, and tray or oil trap. See page 52.

Drain and thoroughly flush the cooling system (page 65). Fill the cooling system with clean, soft water. Add a rust inhibitor. If freezing weather is anticipated, add sufficient antifreeze to protect the cooling system from freezing.

Operate the engine at 1500 rpm with no load until it reaches operating temperature to circulate the coolant with the thermostat open.

On diesel tractors, drain the fuel tank.

On gasoline tractors, drain all fuel from the carburetor, fuel pump, and fuel tank.

On gasoline and LP-Gas tractors, with the engine cold, squirt some engine oil (1/8 pint) in each cylinder through the spark plug holes. Turn engine over 3 or 4 times with the starter. Replace the spark plugs and wipe off the oil.

Remove the valve rocker arm cover (page 71) and spray a thin film of polar type rust preventive (which is completely soluble in engine oil) on the valve operating mechanism, top of the cylinder head, and the underside of the rocker arm cover. Replace the cover.

Raise the tractor high enough so the tires do not touch the ground. Protect the tires from heat and sunlight to prevent undue deterioration.

When long term storage is anticipated, block the clutch pedal in the disengaged position.

Remove and clean the battery or batteries. Follow the instructions on page 68 for storing the battery or batteries.

Seal all openings in the engine and electrical equipment with plastic or other type covers, using a waterproof tape. Do not overlook the exhaust outlet.

Clean the exterior of the tractor, removing all mud, dirt, grease, and other foreign material. To prevent rust, touch up the painted surfaces where they may have been scratched or chipped.

If possible, store the tractor in a dry protected place. If it is necessary to store the tractor outside, cover it with waterproof canvas or other suitable protective material.

A good time to repair and paint your tractor is during the period between tractor working seasons. This can be done by your John Deere dealer at a nominal cost and will prove a profitable investment. A good coat of paint prevents rust, corrosion, and deterioration.

REMOVING THE TRACTOR FROM STORAGE

Use the following procedure to remove your tractor from storage and place it in service.

Remove all protective coverings from the tractor. Check the tires to be sure they are properly inflated and then remove the blocking from the tractor.

Unseal all openings in the engine, exhaust outlet, and electrical equipment.

Remove the batteries from storage, install them on the tractor, and connect the cables and ground straps (page 68). Polarize the generator (page 69). Check the generator belt tension and adjust it if necessary (page 68).

Remove the hood and valve rocker arm cover (page 71) and pour a small quantity of engine oil of the proper weight and quality (page 45) over the valve operating mechanism. Replace the cover and hood.

Fill the fuel tank with fresh fuel.

Check the transmission and hydraulic system oil level and add oil if necessary (page 53). Check and, if necessary, fill the cooling system to its proper level (page 65).

To help maintain the power and efficiency of your tractor, perform the recommended 600-hour service (page 54).

Operate the engine for a few minutes at slow idle to make certain the tractor is in proper operating order before placing the engine under full load.

TROUBLE SHOOTING

If the tractor shows a particular difficulty, check the symptoms listed on the following pages. Possible causes and remedies are given for each symptom. If the possible remedy does not correct the trouble, see your John Deere dealer. When not applicable to all three types of engines, a symbol listed with the possible cause indicates the type of engine to which it does apply - D for a diesel engine, G for a gasoline engine, or LP for an LP-Gas engine.

ENGINE HARD TO START, WILL NOT START

Possible Cause	*Possible Remedy*
No fuel	Fill tank with proper fuel. Page 42.
Old fuel or water in tank (D or G)	Drain and fill with fresh fuel. Page 42.
Improper type of fuel	Consult fuel supplier and use proper fuel for operating conditions. Page 42.
Closed fuel valve	Open the valve. Diesel and gasoline, page 58; LP-Gas, page 6.
Low air temperature	Use a cold-weather starting aid. Page 7.
Low battery output	Check electrolyte level and specific gravity of each battery. Page 67.
Slow starter speed	See "Starter Cranks Slowly." Page 79.
Water, dirt, or air in fuel system (D)	Drain, flush, fill, and bleed system. Pages 58-59.
Clogged fuel filter (D)	Replace first-stage filter element and bleed system. Page 59.
Clogged fuel strainer	Clean sediment bowl and strainer. Diesel, page 57; gasoline, page 60; LP-Gas, page 62.
Dirty or faulty injectors (D)	Check injectors. If necessary, remove them for dealer servicing. Page 59.
No gasoline in carburetor (G)	Clean fuel filter and fuel lines. Check functioning of fuel pump. Open fuel shut-off valve. Page 60.
Dirty spark plugs (G, LP)	Clean plugs and set gap. Page 64.
No spark (G, LP)	See "Ignition System." Page 63.
Excess-flow valve in withdrawal valve closed (LP)	Close withdrawal valve to reset flow valve. Page 6.
Liquid fuel in lines (LP)	See "Stopping the Engine." Page 10.
Automatic fuel shut-off not operating (LP)	Turn on ignition switch. Listen for an audible click at strainer. If no click is heard, see your dealer. Page 61.
Plugged vent on converter (this is a threaded hole) (LP)	Remove restriction from vent. Page 61.
Heavy oil in air cleaner or engine crankcase (LP)	Use correct viscosity oil. Page 46.
Clogged air cleaner or oil trap (LP)	Clean air cleaner and oil trap. Page 54.

ENGINE KNOCKS

Insufficient oil	Add proper oil and call your dealer. Page 45.
Oil picked up by air intake system	Check air cleaner for clogging or excessive oil. Page 54.
Low coolant temperature	See "Below normal engine temperature." Page 77.
Ignition timed too early (G, LP)	See "Timing Distributor." Page 64.

ENGINE KNOCKS—Continued

Possible Cause	*Possible Remedy*
Injection pump out-of-time (D)	See your John Deere dealer.
Low octane fuel (G)	Change to fuel with higher octane. Page 42.
Engine overheating	See "Engine Overheats." Page 77.
Butane content of fuel too high for hot weather (LP)	See your fuel dealer. Page 42.

ENGINE RUNS IRREGULARLY OR STALLS FREQUENTLY

Low coolant temperature	See "Below normal engine temperature." Page 77.
Low air temperature (D)	Use cold-weather starting fluid. Page 7.
Clogged fuel filter (D)	Replace first-stage filter element and bleed system. Page 59.
Clogged fuel strainer	Clean sediment bowl and strainer. Diesel, page 58; gasoline, page 60; LP-Gas, page 62.
Water, dirt, or air in fuel system (D)	Drain, flush, fill, and bleed system. Pages 58-59.
Dirty or faulty injectors (D)	Check injectors. If necessary, remove them for dealer servicing. Page 59.
Improper carburetor setting (G, LP)	See "Adjusting Carburetor." Gasoline, page 60; LP-Gas, page 62.
Improper spark plug gap (G, LP)	Set spark plug gap. Page 64.
Irregular spark (G, LP)	Dirty points. See "Distributor." Page 63.
Dirty spark plugs (G, LP)	Clean plugs and set gap. Page 64.
Carburetor icing (G)	Place manifold heat block in "HOT" position. Page 61.
Leaking fuel hose between converter and carburetor (LP)	Inspect clamps and hose. Replace if necessary. Use only approved parts.

LACK OF ENGINE POWER

Engine overloaded	Reduce load or shift to lower gear.
Crankcase oil too heavy	Drain and fill crankcase with oil of proper weight and quality. Page 45.
Intake air restriction	Clean air cleaner and tray or oil trap. Page 54.
Clogged fuel filter (D)	Replace first-stage filter element and bleed system. Page 58.
Clogged fuel strainer	Clean sediment bowl and strainer. Diesel, page 58; gasoline, page 60; LP-Gas, page 62.
Improper hitching of implement	See implement operator's manual for proper hitching.
Improper type of fuel	Consult fuel supplier and use proper fuel. Page 42.
Overheated engine	See "Engine Overheats." Page 77.
Vent on fuel tank obstructed (D, G)	Clean vent. Wash in distillate and blow out with air. Page 58.
Too heavy an oil in air cleaner	Fill oil cup with proper oil. Page 46.
Engine not up to temperature	See that thermostat is operating correctly. Page 65.
Overheated intake air (G)	At temperatures above 32°F., set heat valve blocks "COLD." Page 61.
Improper valve clearance	Check clearance and adjust if necessary. Page 71.
Dirty or faulty injectors (D)	Check injectors and, if necessary, remove them for dealer servicing. Page 59.
Injection pump out-of-time (D)	See your John Deere dealer for this service.
Dirty spark plugs (G, LP)	Clean plugs and set gap. Page 64.
Improper ignition timing (G, LP)	See "Timing Distributor." Page 64.
Plugged vent on converter (LP)	Remove restriction from vent. Page 61.

LACK OF ENGINE POWER—Continued

Possible Cause	*Possible Remedy*
Clogged fuel strainer (strainer frosts) (LP)	Clean strainer. Page 62.
Closed excess-flow valves in vapor or liquid withdrawal valves (indicated by frost on valves) (LP)	Close frosted withdrawal valve to reset excess-flow valve, then open withdrawal valve slowly. Page 6.
Plugged fuel lines (indicated by frost) (LP)	Check for free flow of fuel between tank and fuel strainer. Be sure to comply with safety precautions. Page 62.
Leaking converter-to-carburetor fuel hose (LP)	Inspect clamps and hose. Replace if necessary. Use only approved parts. Page 61.
Improper carburetor load adjustment (G, LP)	See "Load Adjustment." Gasoline, page 60; LP-Gas, page 62.

ENGINE OVERHEATS

Temperature gauge defective	Check water with thermometer. Replace gauge if defective.
Chaff and trash on radiator core	Clean core by flushing out chaff. Page 66.
Cooling system needs flushing	Drain and flush cooling system. Page 65.
Defective thermostat	Remove and check thermostat. Page 65.
Use of low octane fuel that causes knocking (G)	Change to better fuel. Page 42.
Butane content too high (LP)	Change to fuel of lower butane content. Page 42.
Improper ignition timing (G, LP)	See "Timing Distributor." Page 64.
Loose generator belt	Adjust belt tension. Page 68.
Faulty radiator cap	Have serviceman check radiator cap.

BELOW NORMAL ENGINE TEMPERATURE

Defective thermostat	Remove and check thermostat. Page 65.

LOW ENGINE OIL PRESSURE

Low oil level	Check crankcase oil level on dipstick and add oil if necessary. Page 50.
Improper type of oil	Drain and fill crankcase with oil of the proper weight and quality. Page 45.

HIGH ENGINE OIL CONSUMPTION

Crankcase oil too light	Drain and fill crankcase with oil of the proper weight and quality. Page 45.
Oil leaks	Check for leaks around gaskets and drain plugs.

HIGH FUEL CONSUMPTION

Improper type of fuel	Consult your fuel supplier and use proper type of fuel for operating conditions. Page 42.
Engine overloaded	Reduce load or shift to lower gear.
Clogged or dirty air cleaner	Clean air cleaner and tray or oil trap. Replace oil if necessary. Page 54.
Improper hitching of implement	See implement operator's manual for proper hitching.
Improper valve clearance	Check clearance and adjust if necessary. Page 71.

HIGH FUEL CONSUMPTION—Continued

Possible Cause	*Possible Remedy*
Dirty or faulty injectors (D)	Check injectors and, if necessary, remove them for dealer servicing. Page 59.
Injection pump out of time (D)	Injection pump should be timed properly. See your John Deere dealer for this service.
Ignition out of time (G, LP)	Time distributor. Page 64.
Improper carburetor adjustment (G, LP)	See "Adjusting Carburetor." Gasoline, page 60; LP-Gas, page 62.
Engine not operated at proper temperature	Check thermostat. Page 65.

DIESEL ENGINE EMITS BLACK OR GRAY EXHAUST SMOKE

Improper type of fuel	Consult your fuel supplier and use proper type fuel for operating conditions. Page 42.
Engine overloaded	Reduce load or shift to a lower gear.
Clogged or dirty air cleaner	Check air cleaner for restrictions. Be sure screens are clean and cup is filled with oil of the proper weight and quantity. Page 53.
Defective muffler	Check the muffler for possible damage which might create back pressure.
Dirty or faulty injectors	Check injectors and, if necessary, remove them for dealer servicing. Page 59.
Engine out of time	Make sure injection pump is timed properly. See your John Deere dealer for this service.

GASOLINE ENGINE EMITS BLACK OR GRAY SMOKE

Improper carburetor adjustment	See "Adjusting Carburetor." Page 60.
Clogged or dirty air cleaner	Clean air cleaner and oil trap. Page 54.

ENGINE EMITS WHITE SMOKE

Improper type of fuel (D, G)	Consult fuel supplier and use proper type of fuel for operating conditions. Page 42.
Cold engine (D)	Warm engine up to normal operating temperature.
Defective thermostat (D)	Remove and check thermostat. Page 65.
Injection pump out-of-time (D)	Have your John Deere dealer make sure injection pump is timed properly.

SPARK PLUG FOULING

Low engine temperature	Check thermostat. Page 65.
Wrong heat range plug used	See your John Deere dealer for correct spark plugs.

LP-GAS CONVERTER FREEZES UP WHEN ENGINE IS COLD

Running on liquid fuel before engine is warmed up	See "Starting the Engine." Page 6.

FROST ON LP-GAS WITHDRAWAL VALVE

Closed excess-flow valve	Close withdrawal valve to reset excess-flow valve, then open withdrawal valve slowly. Page 6.

LP-GAS CONVERTER FREEZES UP DURING NORMAL OPERATION

Possible Cause	*Possible Remedy*
Defective thermostat	Replace thermostat. Page 65.
Restrictions in water piping or converter	Have serviceman check and correct.
Running on liquid fuel before engine is warmed up	See "Starting the Engine." Page 6.

LACK OF FUEL AT CARBURETOR

No fuel in tank	See "Filling Fuel Tank." Page 44.
Liquid withdrawal valve closed	Close vapor withdrawal valve and open liquid withdrawal valve. Page 6.
Excess-flow valve in withdrawal valve closed	Close withdrawal valve to reset excess-flow valve. Open withdrawal valve slowly. Page 6.
Restricted fuel strainer (strainer has frost on it)	Clean strainer. Page 62.
Inoperative fuel shut-off valve on strainer	Turn on ignition switch. Listen for an audible click at strainer. If no click is heard have serviceman check and correct. Page 61.
Restricted fuel lines	Check all lines for kinks or other restrictions. Use only approved parts when replacing unserviceable lines or fittings.

BATTERIES WILL NOT CHARGE

Loose or corroded connections	Clean and tighten battery connections. Page 68.
Sulfated or worn-out batteries	Check specific gravity and electrolyte level of each battery. Page 67.
Loose or defective generator belt	Adjust belt. Replace worn belt. Page 68.

STARTER INOPERATIVE

Loose or corroded connections	Clean and tighten loose connections. Page 68.
Low battery output	Check specific gravity and electrolyte level of each battery. Page 67.
Tractor in gear (Syncro-Range tractors) or inching pedal not depressed (Power Shift tractors)	Place shift lever in neutral (Syncro-Range tractors) or depress inching pedal (Power Shift Tractors). Pages 12-14.

STARTER CRANKS SLOWLY

Low battery output	Check specific gravity and electrolyte level of each battery. Page 67.
Crankcase oil too heavy	Drain and fill crankcase with oil of proper weight and quality. Page 45.
Loose or corroded connections	Clean and tighten loose connections. Page 68.

LOW OIL PRESSURE (Power Shift Transmission)

Clogged transmission oil filter element (front)	Replace filter element. Page 55.
Clogged hydraulic oil filter element (rear)	Replace filter element. Page 55.
Low oil supply	Fill system with proper oil. Page 53.

TRANSMISSION OIL OVERHEATS (Power Shift Transmission)

Possible Cause	*Possible Remedy*
Low oil supply	Fill system with proper oil. Page 53.
Oil cooler air passages clogged	Clean oil cooler. Page 66.
Excessive shifting under heavy load	Reduce shifting or load.

ENTIRE HYDRAULIC SYSTEM FAILS TO FUNCTION

Low oil supply	Fill system with proper oil to mark on dipstick. Page 53.
Clogged filters	Replace filters, Page 55.
Hydraulic pump shutoff (special equipment)	Back screw out to internal stop. Page 8.
Possible dirt in hydraulic pump	Shut pump off and turn it on. Check filters for clogging. Page 8.

HYDRAULIC OIL OVERHEATS

Low oil supply	Fill system with proper oil. Page 53.
Oil cooler air passage clogged	Clean oil cooler. Page 66.

INSUFFICIENT HITCH TRANSPORT CLEARANCE

Center link too long	Adjust center link. Page 28.
Lift links too long	Adjust lift links. Pages 29, 31.
Implement not level	Level implement by adjusting lift links. Page 29.
Implement improperly adjusted	See implement operator's manual.

HITCH FAILS TO LIFT

Excessive load on hitch	Adjust auxiliary springs on implement or reduce load.

HITCH DROPS SLOWLY

Speed-of-drop valve not set properly	Adjust speed-of-drop. Page 26.

HITCH TOO ACTIVE

Selector lever in wrong position	Place selector lever in "LD" position. Page 26.

NO HITCH RESPONSE TO DRAFT LOAD

Selector lever in wrong position or speed-of-drop too slow	Place selector lever in "LD" or "L" position or adjust speed-of-drop. Page 26.

REMOTE CYLINDER WILL NOT LIFT LOAD

Excessive load	Adjust auxiliary springs on implement or reduce load.
Breakaway coupler not completely engaged	Attach hoses to coupler correctly. Page 33.

REMOTE CYLINDER RATE OF TRAVEL INCORRECT

Incorrect flow control valve setting	Adjust rate of operation. Page 33.

NO REMOTE CYLINDER FLOAT POSITION

Possible Cause	*Possible Remedy*
Control rod in lower hole on control lever	Move control rod to upper hole on control lever. Page 33.

DIRECTION OF REMOTE CYLINDER TRAVEL IS REVERSED

Improper hose connections	Reverse hose connections. Page 33.

BRAKE PEDAL BOTTOMS WHEN ENGINE IS STOPPED

Bleed screws left open	Bleed brakes and tighten bleed screws. Page 72.
Air in system	Bleed brakes. Page 72.

BRAKE PEDAL FEELS SPONGY

Air in system	Bleed brakes. Page 72.

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That's what the owner of this pair of work shoes is finding out—the hard way. Through a careless action, he has become the victim of an accident. It's a mighty tough way to find out that nobody else can wear your shoes or practice safety for you. And a needless, costly lesson to learn that safety is an everyday need.

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